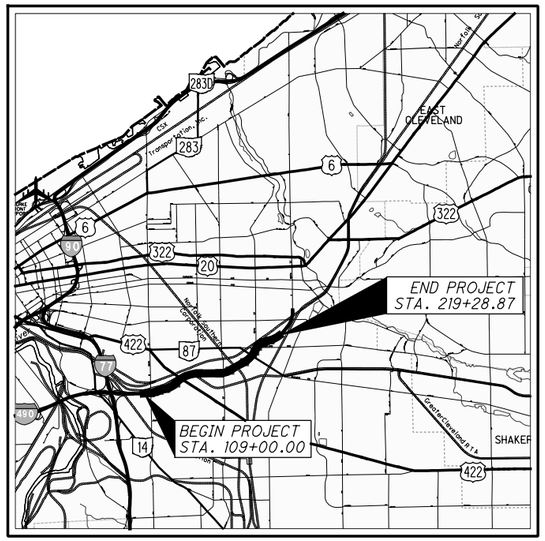

LOCATION MAP

LATITUDE: 41°29'08" LONGITUDE: 81°37'22"

SCALE IN MILES
0 1 2 3 4

N

PORTION TO BE IMPROVED
INTERSTATE HIGHWAY
FEDERAL ROUTES
STATE ROUTES
COUNTY & TOWNSHIP ROADS
OTHER ROADS

DESIGN DESIGNATION

CURRENT ADT (2017)	*35,820*
DESIGN YEAR ADT (2020)	*48,230*
DESIGN HOURLY VOLUME (2020)	*3,580*
DIRECTIONAL DISTRIBUTION	*58%*
TRUCKS (24 HOUR B&C)	*6%*
DESIGN SPEED	*40 MPH*
LEGAL SPEED	*35 MPH*
DESIGN FUNCTIONAL CLASSIFICATION	*URBAN PRINCIPAL ARTERIAL*
NHS PROJECT	*NO*

DESIGN EXCEPTIONS

NONE

UNDERGROUND UTILITIES

CONTACT BOTH SERVICES TWO WORKING DAYS
BEFORE YOU DIG.

OHIO Utilities Protection SERVICE
Call Before You Dig
1-800-362-2764
(Non-members must be called directly)

OIL & GAS PRODUCERS
UNDERGROUND PROTECTION SERVICE
1-800-925-0988

The Kokosing Design-Build Team
Kokosing | Michael Baker | Richland Engineering | Brownstone Grey

ENGINEERS SEAL:

STATE OF OHIO
JULIA A. HART
E-69738
REGISTERED
PROFESSIONAL ENGINEER

SIGNED: Julia A. Hart
DATE: 9/30/19

ENGINEERS SEAL:

SIGNED:
DATE:

STATE OF OHIO

DEPARTMENT OF TRANSPORTATION

CUY-IR490/SR010-2.09/19.28

CITY OF CLEVELAND

CUYAHOGA COUNTY

NORFOLK SOUTHERN RAILWAY

INDEX OF SHEETS:

SEE SHEET 2

BU-25
E 89TH ST
PEDESTRIAN BRIDGE

PLAN PREPARED BY:

2LMN, Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF THE CONSTRUCTION OF 2.09 MILES OF A NEW TWO- TO THREE-LANE BOULEVARD FROM E. 55TH ST. TO E. 93RD ST. WORK INCLUDES PAVEMENT, RAILROAD, STRUCTURES, DRAINAGE, WATERWORK, LIGHTING, POWER DISTRIBUTION, TRAFFIC CONTROL, LANDSCAPING, AND ADJUSTMENT OF EXISTING UTILITIES.

RAILROAD INVOLVMENT INCLUDES GCRTA AND NORFOLK SOUTHERN RAILWAY, (NS DEARBORN DIVISION, LAKE ERIE DISTRICT, MP B-180.79).

EARTH DISTURBED AREAS

PROJECT EARTH DISTURBED AREA:	*87.2 ACRES*
ESTIMATED CONTRACTOR EARTH DISTURBED AREA:	*0 ACRES*
NOTICE OF INTENT EARTH DISTURBED AREA:	*87.2 ACRES*

(AREA SERVICED BY COMBINED SEWER)

2016 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

ODOT STANDARD CONSTRUCTION DRAWINGS		*CITY OF CLEVELAND STANDARD CONSTRUCTION DRAWINGS*		*ODOT SUPPLEMENTAL SPECIFICATIONS*		*SPECIAL PROVISIONS*
A-1-69	07/19/02			800	4-15-16	GCRTA STANDARDS
BR-2-15	07/17/15			840	4-15-16	SECTION 014500
DM-1.1	07/20/01					SECTION 015010
EXJ-4-87	07/19/02					SECTION 015020
F-1.1	07/19/13					
HL-30.31	01/17/14					NS PUBLIC WORKS
HL-50.21	07/15/16					MANUAL
VPF-1-90	07/17/15					
				ODOT SUPPLEMENTS		
				1078	12-31-12	
				1083	4-15-16	

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

FEDERAL PROJECT NO. E140 (249)
PID NO. 96833
CONSTRUCTION PROJECT NO. 17-3000
RAILROAD INVOLVEMENT NORFOLK SOUTHERN GCRTA
CUY-IR490/SR010-2.09/19.28
RECORD PLANS
RECORD PLANS
RECORD PLANS

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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INDEX OF SHEETS

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0	2019-09-30	1	TITLE SHEET
1	2024-09-10	2	INDEX OF SHEETS
1	2024-09-10	3	SITE PLAN
0	2019-09-30	4	SUPPLEMENTAL SITE PLAN
0	2019-09-30	5	GENERAL NOTES
1	2024-09-10	6	GENERAL NOTES
0	2019-09-30	7	GENERAL NOTES
1	2024-09-10	8	EXISTING REAR ABUTMENT REMOVAL
1	2024-09-10	9	EXISTING REAR ABUTMENT
0	2019-09-30	10	FORWARD ABUTMENT REMOVAL
0	2019-09-30	11	FOUNDATION PLAN
1	2024-09-10	12	REAR ABUTMENT MSE WALL
1	2024-09-10	13	REAR ABUTMENT PLAN & ELEVATION
0	2019-09-30	14	REAR ABUTMENT WINGWALLS
1	2024-09-10	15	REAR ABUTMENT SECTIONS
1	2024-09-10	16	FORWARD ABUTMENT PLAN & ELEVATION
0	2019-09-30	17	FORWARD ABUTMENT WINGWALLS
1	2024-09-10	18	FORWARD ABUTMENT SECTIONS
1	2024-09-10	19	PIER 1 DETAILS
1	2024-09-10	20	PIER 2 DETAILS
1	2024-09-10	21	BEAM DETAILS & FRAMING PLAN
0	2019-09-30	22	FIELD SPLICE DETAILS, CAMBER & BLOCKING
1	2024-09-10	23	TRANSVERSE SECTION
1	2024-09-10	24	TRANSVERSE SECTION AT PIER 1
0	2019-09-30	25	DECK PLAN
0	2019-09-30	26	SCREED, TOP OF HAUNCH & FINAL DECK ELEVATIONS
0	2019-09-30	27	PARAPET PLAN
0	2019-09-30	28	LEFT PARAPET ELEVATION
0	2019-09-30	29	RIGHT PARAPET ELEVATION
1	2024-09-10	30	PARAET DETAILS
1	2024-09-10	31	PARAPET AND FENCE DETAILS
1	2024-09-10	32	PYLON DETAILS
1	2024-09-10	33	BEARING DETAILS
1	2024-09-10	34	EXPANSION JOINT DETAILS
1	2024-09-10	35	SIGNAL WIRE CONNECTION
1	2024-09-10	36	UTILITY DETAILS
0	2019-09-30	37	REINFORCING STEEL LIST
0	2019-09-30	38	REINFORCING STEEL LIST
0	2019-09-30	39	REINFORCING STEEL LIST

ISSUE NO.	RECORD DATE	PAGE NO.	SHEET TITLE

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

CUY-IR490/SR010-2.09/19.28

RECORD PLANS

RECORD PLANS

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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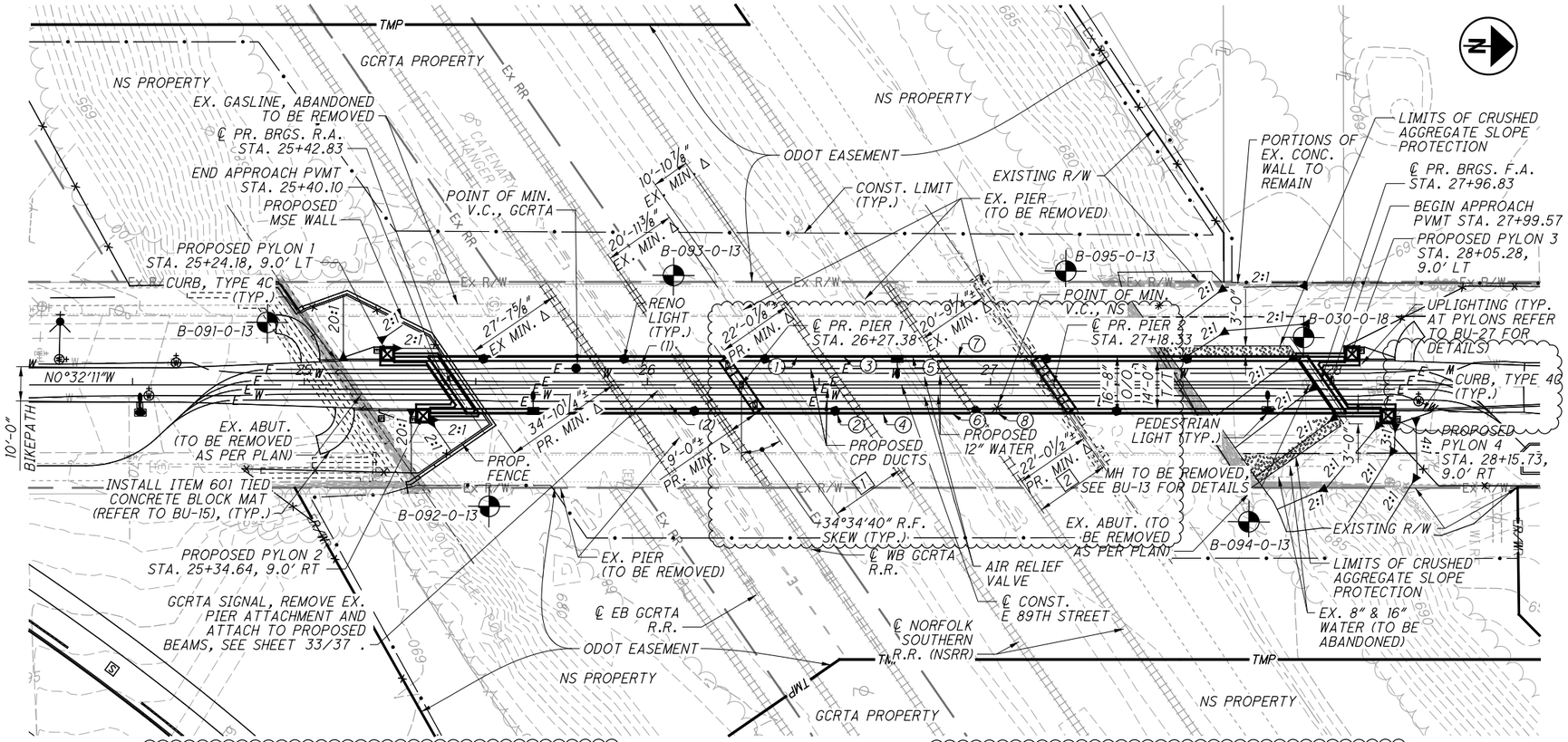


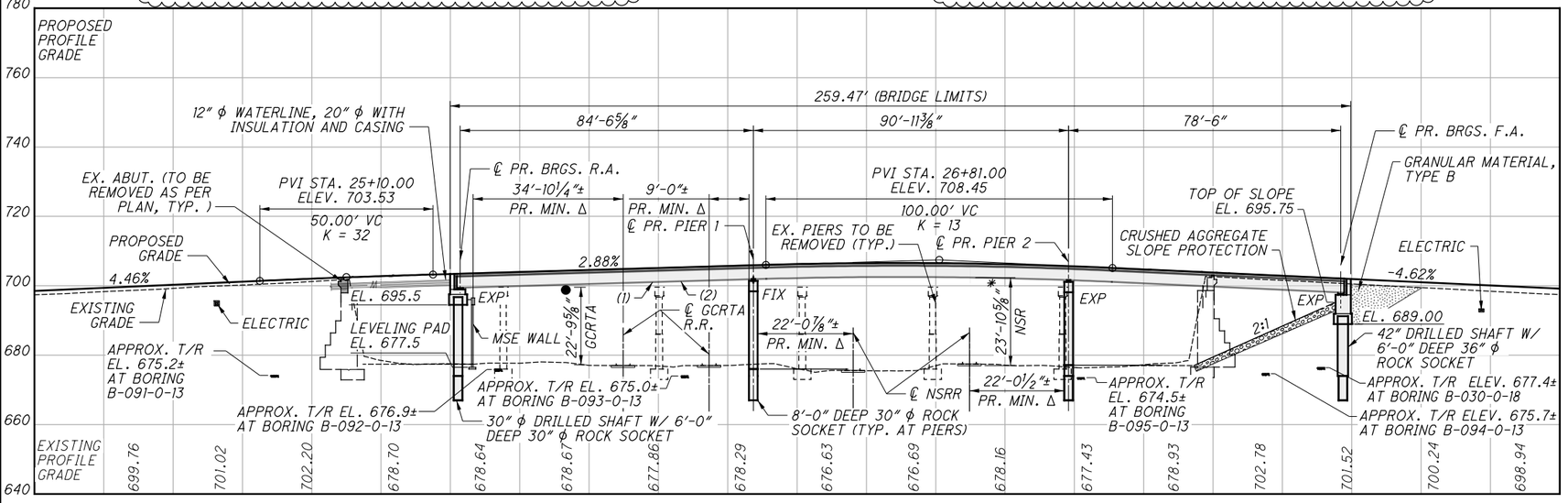
VERTICAL CLEARANCES MEASURED POST-CONSTRUCTION:

① V.C = 26'-1½" ④ V.C = 25'-11" ⑦ V.C = 24'-0"
② V.C. = 26'-1½" ⑤ V.C. = 25'-0" ⑧ V.C. = 23'-9"
③ V.C. = 26'-1" ⑥ V.C. = 24'-9½"

HORIZONTAL CLEARANCES MEASURED POST-CONSTRUCTION:

1 H.C = 21'-10⁵⁄₁₆"
2 H.C. = 21'-11⁵⁄₁₆"

PLAN



PROFILE

ALONG ℄ CONSTRUCTION E 89TH STREET

BENCHMARK DATA

BM MN6: FENO SET IN RD. BOX, STA. 20+29.80, 30.38' LT., ELEV. 687.71
BM MN7: FENO SET IN RD. BOX, STA. 40+14.48, 47.19' RT., ELEV. 690.52

FOR ADDITIONAL BENCHMARK AND PATH INFORMATION. SEE ROADWAY PLAN SHEETS, BU-15.

NOTES

EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS SECTIONS AND GRADING PLANS.
DESIGN TRAFFIC:
N/A

LEGEND

- BORING LOCATION
- RENO LIGHT LOCATION
- 17'-0" REQUIRED MINIMUM VERTICAL CLEARANCE (GCRTA)
- ✱ 23'-0" REQUIRED MINIMUM VERTICAL CLEARANCE (NS)
- Δ 9'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (GCRTA)
- 22'-0" REQUIRED MINIMUM HORIZONTAL CLEARANCE (NS), PERP. DIMENSION PROVIDED
- (1) GCRTA SIGNAL WIRE ATTACH TO BEAM 1
- (2) GCRTA SIGNAL WIRE ATTACH TO BEAM 3

EXISTING STRUCTURE

TYPE: REINFORCED CONCRETE DECK SLAB ON SIX-SPAN CONTINUOUS COMPOSITE WELDED STEEL PLATE GIRDERS SUPPORTED ON REINFORCED CONCRETE SUBSTRUCTURE
SPANS: 41'-11"±, 44'-11"±, 41'-3"±, 37'-7±, 37'-6"±, 38'-4"±
ROADWAY: 40'-0"± TOE/TOE SIDEWALK
LOADING: HS 20-44 CASE II
SKEW: 34°34'40"± R.F.
APPROACH SLABS: 15'-0" (AS-1-81)
ALIGNMENT: TANGENT
CROWN: PARABOLIC
STRUCTURAL FILE NUMBER: 1812440
DATE BUILT: 1929, 1998
DISPOSITION: TO BE REPLACED

PROPOSED STRUCTURE

TYPE: COMPOSITE REINFORCED CONCRETE DECK SLAB ON THREE-SPAN CONTINUOUS STEEL BEAMS (WEATHERING STEEL) SUPPORTED ON REINFORCED CONCRETE SUBSTRUCTURES ON DRILLED SHAFTS
SPANS: 84'-6 5⁄8", 90'-11 3⁄8", 78'-6" (C/C BEARINGS)
ROADWAY: 14'-0" TOE/TOE PARAPET
LOADING: H15-44 OR 90 PSF PEDESTRIAN LOADING
SKEW: 34°34'40" R.F.
APPROACH SLABS: NONE
ALIGNMENT: TANGENT
CROWN: 0.02 FT/FT
STRUCTURE FILE NUMBER: TBD
COORDINATES: LATITUDE 41°29'20.01" N
LONGITUDE 81°37'28.16" W

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED	DRAWN	REVIEWED	DATE
JBM	MAK	MUR	9/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

CUYAHOGA COUNTY
STA. 25+40.10
STA. 27+99.57

RECORD PLANS

SITE PLAN
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

1 / 37

3 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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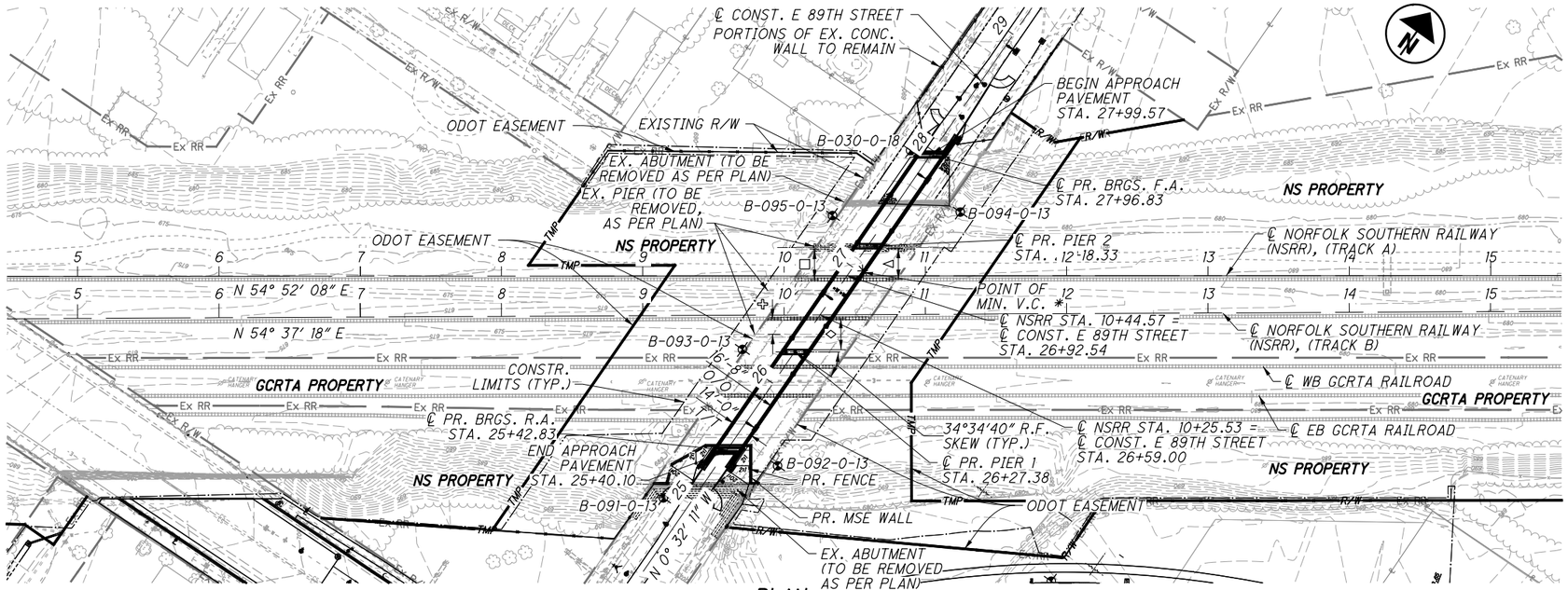
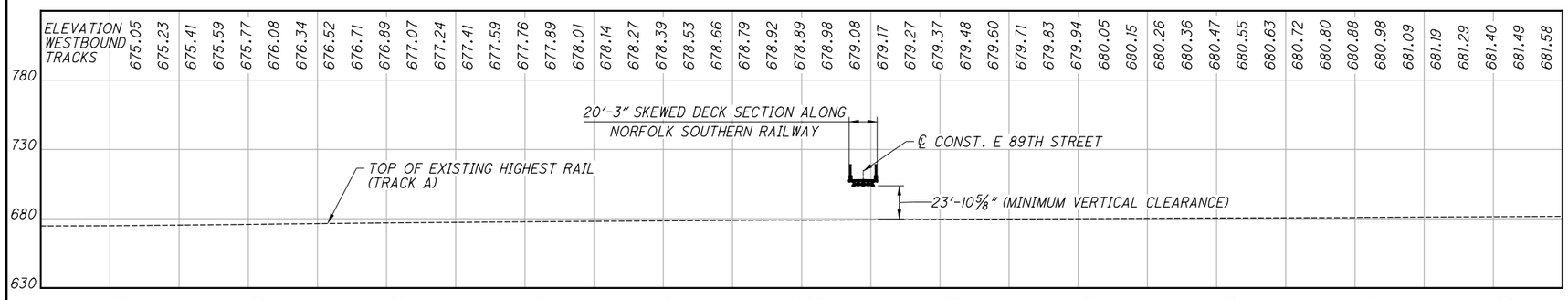
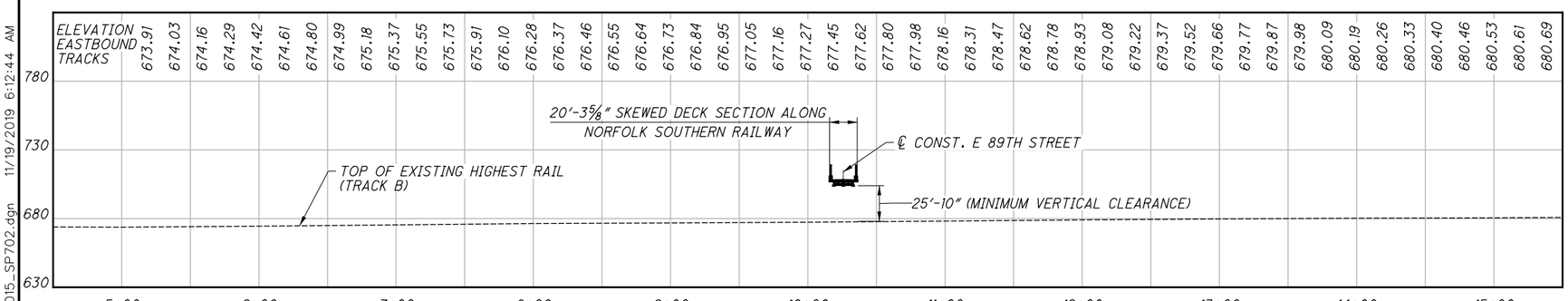


PLAN



PROFILE

ALONG ℄ NORFOLK SOUTHERN RAILWAY, TRACK A (HIGHEST RAIL)



PROFILE

ALONG ℄ NORFOLK SOUTHERN RAILWAY, TRACK B (HIGHEST RAIL)

NOTE:

THE ELEVATION OF THE EXISTING TOP-OF-RAIL PROFILE SHALL BE VERIFIED BEFORE BEGINNING CONSTRUCTION. ALL DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE NORFOLK SOUTHERN PUBLIC PROJECTS ENGINEER.

LEGEND:

- BORING LOCATION
- RENO LIGHT LOCATION
- PEDESTRIAN LIGHT LOCATION
- △ 22′-0″ MINIMUM HORIZONTAL CLEARANCE REQUIRED; 22′-0½″ ACTUAL PROPOSED MINIMUM HORIZONTAL CLEARANCE
- □ 22′-0″ MINIMUM HORIZONTAL CLEARANCE REQUIRED; 20′-9¼″ ACTUAL EXISTING MINIMUM HORIZONTAL CLEARANCE
- ◇ 22′-0″ MINIMUM HORIZONTAL CLEARANCE REQUIRED; 22′-0⅞″″ ACTUAL PROPOSED MINIMUM HORIZONTAL CLEARANCE
- ✣ 22′-0″ MINIMUM HORIZONTAL CLEARANCE REQUIRED; 10′-10⅞″ ACTUAL EXISTING MINIMUM HORIZONTAL CLEARANCE
- ✳ 23′-0″ MINIMUM VERTICAL CLEARANCE REQUIRED; 23′-10⅝″ ACTUAL PROPOSED MINIMUM VERTICAL CLEARANCE

CUYAHOGA COUNTY, OHIO
EXISTING E 89TH STREET
NORFOLK SOUTHERN RAILWAY
NS DEARBORN DIVISION, LAKE ERIE DISTRICT
MILE POST B-180.79
AVERAGE DAILY TRAIN TRAFFIC:
20 FREIGHT TRAINS PER DAY AT A MAXIMUM AUTHORIZED OPERATING SPEED OF 40 MILES PER HOUR

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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DESIGN AGENCY
DLMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED	DRAWN	REVIEWED	DATE
JBM	JBM	MUR	10/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

CUYAHOGA COUNTY
STA. 25+40.10
STA. 27+99.57

RECORD PLANS

SUPPLEMENTAL SITE PLAN
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

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STANDARD DRAWINGS AND SUPPLEMENTAL SPECIFICATIONS:

REFER TO THE FOLLOWING STANDARD BRIDGE DRAWINGS:

A-1-69	REVISED 7-19-02
BR-2-15	REVISED 7-17-15
DM-1.1	REVISED 7-20-01
EXJ-4-87	REVISED 7-19-02
F-1.1	REVISED 7-19-13
HL-30.31	REVISED 1-17-14
HL-50.21	REVISED 7-15-16
VPF-1-90	REVISED 7-17-15

AND THE FOLLOWING SUPPLEMENTAL SPECIFICATIONS:

800	REVISED 4-15-16
840	REVISED 4-15-16

DESIGN SPECIFICATIONS:

THIS STRUCTURE CONFORMS TO THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, SEVENTH EDITION, INCLUDING THE 2016 INTERIM SPECIFICATIONS AND THE ODOT BRIDGE DESIGN MANUAL, 2007.

DESIGN LOADING:

0.090 KSF AND H15-44 VEHICLE

DESIGN STRESSES:

BRIDGE:

CONCRETE CLASS QC2 - COMPRESSIVE STRENGTH 4.5 KSI (SUPERSTRUCTURE)
CONCRETE CLASS QC1 - COMPRESSIVE STRENGTH 4.0 KSI (SUBSTRUCTURE)
CONCRETE CLASS QC5 - COMPRESSIVE STRENGTH 4.5 KSI (DRILLED SHAFT)
REINFORCING STEEL - MINIMUM YIELD STRENGTH 60 KSI
STRUCTURAL STEEL - ASTM A709 GRADE 50 W - YIELD STRENGTH 50 KSI

MSE WALL:

CONCRETE CLASS QC1 - COMPRESSIVE STRENGTH 4.0 KSI (CONCRETE COPING)
REINFORCING STEEL - ASTM A615 OR A996 GRADE 60, MINIMUM YIELD STRENGTH 60 KSI.
- ALL REINFORCING STEEL SHALL BE EPOXY COATED PER CMS 709.00
SOIL UNIT WEIGHT, = 120 PCF
ANGLE OF INTERNALYFRICTION, ϕ = 30°

WALL	MIN. STRAP LENGTH, (%H)	BEGIN STA.	END STA.	WALL OR ABUTMENT	FACTORED BEARING RESISTANCE (KSF)
RA	70%	25+33.27	25+37.79	WALL	18.46
RA	70%	25+37.79	25+54.71	WALL	18.46
RA	70%	25+54.71	25+46.73	ABUTMENT	18.46
RA	70%	25+46.73	25+36.72	ABUTMENT	18.46
RA	70%	25+36.72	25+12.47	WALL	18.46
RA	70%	25+12.47	24+99.91	WALL	18.46

NOTE: THE MINIMUM SOIL REINFORCEMENT LENGTH IS AT LEAST 8 FEET OR THE PERCENTAGE OF THE WALL HEIGHT SHOWN ABOVE, WHICHEVER IS GREATER. FOR WALL SECTIONS DENOTED AS "ABUTMENTS", THE STRAP LENGTH WILL NEED TO BE 70% OF THE DISTANCE BETWEEN THE TOP OF THE LEVELING PAD AND THE TOP OF PAVEMENT.

DECK PROTECTION METHOD:

EPOXY COATED REINFORCING STEEL
2½" CONCRETE COVER

MONOLITHIC WEARING SURFACE:

MONOLITHIC WEARING SURFACE IS ASSUMED, FOR DESIGN PURPOSES, TO BE 1 INCH THICK.

PROPRIETARY WINGWALL DATA:

THE PROPRIETARY WALL SUPPLIER SHALL DESIGN THE INTERNAL STABILITY OF A MECHANICALLY STABILIZED EARTH (MSE) WALL IN ACCORDANCE WITH SS840 TO SUPPORT THE ABUTMENT. THE DESIGN FOR INTERNAL STABILITY SHALL INCLUDE A NOMINAL (I.E. UNFACTORED) HORIZONTAL STRIP LOAD DUE TO FRICTION (FR) FROM THE SUPERSTRUCTURE OF 2.83 K/FT APPLIED PERPENDICULAR TO THE FACE OF WALL AT THE BASE OF THE CONCRETE FOOTING. THIS STRIP LOAD DOES NOT INCLUDE EARTH PRESSURE LOADS FROM THE ABUTMENT BACKFILL. HOWEVER, THE PROPRIETARY WALL SUPPLIER SHALL INCLUDE EARTH PRESSURE LOADS FROM THE ABUTMENT BACKFILL IN THE DESIGN CALCULATIONS.

WATERWORKS:

REFER TO BU-10 PLANS FOR DETAILS OF WATERWORKS.

MATERIALS:
WATERLINE JACKET SHALL BE 17.3" DIA. X 0.016" (THICKNESS) ALUMINUM. WATERLINE CASTING PIPE SHALL BE WELDED SMOOTH WALL 20" DIA. X 10 GAUGE STEEL CONDUIT, AS PER ASTM A-139 OR A-135, CORROSION COATED WITH 30 MILS NOVACOAT COATING.

CLEVELAND PUBLIC POWER (CPP):

REFER TO BU-12 PLANS FOR DETAILS OF CPP DUCTS.

ITEM 203 - EMBANKMENT, AS PER PLAN:

PLACE AND COMPACT EMBANKMENT MATERIAL IN 6 INCH LIFTS FOR THE CONSTRUCTION OF THE APPROACH EMBANKMENT.

ITEM 511 - QC/QA CONCRETE, AS PER PLAN:

BRIDGE PARAPETS AND PYLONS SHALL UTILIZE A RUBBED FINISH PER CMS 511.158.

ITEM 511: CLASS QC2 CONCRETE WITH QA/QC, BRIDGE DECK, AS PER PLAN:

DESCRIPTION:

IN ADDITION TO THE WORK REQUIREMENTS OF 511, EITHER PROVIDE TRADITIONAL BRIDGE DECK FORMS CONFORMING TO CMS 508 OR DESIGN, BUILD, PROVIDE AND CONSTRUCT GALVANIZED STEEL STAY-IN-PLACE (SIP) FABRICATED METAL FORMS CONFORMING TO CMS 508 AND THESE ADDITIONAL REQUIREMENTS.

DESIGN, BUILD, CONSTRUCT AND REMOVE SIP OR REMOVABLE FORMS AT OVERHANGS, WITHIN EIGHT FEET OF ALL EXPANSION JOINTS AND FOUR FEET OF ALL THROUGH DECK DRAINAGE SYSTEMS, AND AT THE AIR REFLEIF VALVE LOCATIONS IN THE DECK SLAB.

DESIGN:
SUBMIT CONSTRUCTION PLANS ACCORDING TO 501.05.B.3. DESIGN SIP FORMS TO SUPPORT THE SELF WEIGHT OF SIP FORMS, REINFORCEMENT, WET CONCRETE FOR THE DECK, ANY CONSTRUCTION EQUIPMENT LOADS, AND AT LEAST A 50 PSF LOAD FOR CONSTRUCTION LIVE LOADS. MEET THE DEFLECTION REQUIREMENTS OF 508.

DESIGN SIP FORMS THAT HAVE THE DEPTH OF THE FORM CORRUGATION FILLED WITH CONCRETE. SYNTHETIC MATERIALS SUCH AS EXPANDED POLYSTYRENE ARE NOT ALLOWED FOR FILLING FLUTES.

ITEM 511: CLASS QC2 CONCRETE WITH QA/QC, BRIDGE DECK, AS PER PLAN (CONTINUED):

INCLUDE THE FOLLOWING INFORMATION IN THE CONSTRUCTION PLAN:

A. DESIGN CALCULATIONS
B. PHYSICAL PROPERTIES OF THE SIP FORMS (GAGE, SECTION MODULUS, WEIGHT, DEPTH AND PITCH)
C. CROSS SECTION VIEW AND DIMENSIONS OF: SIP FORMS, SUPPORT ANGLES, CHANNEL CLOSURES, SAFETY STOPS, CLIPS, PLATES AND HARDWARE.
D. INCLUDE AN OVERALL LAYOUT PLAN WITH
   1. WORKING POINTS OR CONTROL ELEVATIONS NECESSARY TO SET SUPPORT ANGLES.
   2. TYPICAL AND SPECIFIC CROSS SECTIONS OR DETAILS: SUPPORT CONNECTIONS TO THE STRUCTURAL MEMBERS, SIP FORM CONNECTIONS TO SUPPORTS, FORM LAPS AND CLOSURE SECTIONS.
   3. MINIMUM BEARING LENGTHS (EDGE DISTANCES) OF SIP FORMS TO THE SUPPORT ANGLES.
   4. WELDING DETAILS: SIZE, LENGTH, LOCATIONS, ELECTRODES AND PROCESS.
E. WORKER SAFETY RESTRICTIONS
F. INSTALLATION INSPECTION CHECK LISTS

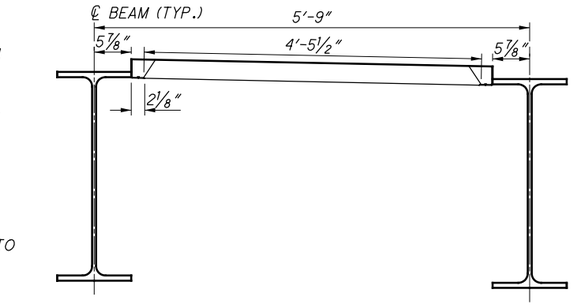
MATERIALS:
SUBMIT 501.06 TEST REPORTS AND WRITTEN ACCEPTANCE LETTERS TO THE ENGINEER. MATERIALS INSPECTION AND ACCEPTANCE IS PERFORMED BY THE ENGINEER AT THE PROJECT SITE. FURNISH FORM, SUPPORT MATERIALS AND HARDWARE CONFORMING THE FOLLOWING:

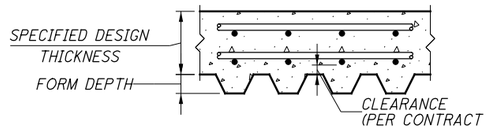
A. FORM AND SUPPORT MATERIAL, ASTM A653 HAVING A COATING DESIGNATION OF G235, AND CONFORMING TO THE MECHANICAL PROPERTIES THE DESIGN REQUIRES. SIP FORMS SHALL BE SHOP-GALVANIZED.
B. PROVIDE DECK FORMS WITH A 2 INCH MINIMUM FORMDEPTH.
C. PROVIDE MINIMUM MATERIAL THICKNESS AS FOLLOWS: SIP FORMS (20 GAGE), SUPPORT ANGLES (12 GAGE) ANDSUPPORT BARS (12 GAGE).
D. SUPPLY DECK, SELF DRILLING FASTENERS WITH CADMIUM PLATING PER ASTM B766 WITH MINIMUM THICKNESS OF 5, TEN THOUSANDTHS (0.0005 INCH). THE HEADS OF THESE FASTENERS WILL BE A HIGHLY VISIBLE COLOR, RED OR OTHER, TO AID INSPECTION.

WELDING:
DO NOT WELD SIP FORMS OR THEIR SUPPORTS TO THE STEEL BRIDGE MEMBERS.

INSTALLATION LIMITATIONS:

A. FIELD CUT SIP FORMS USING MECHANICAL CUTTING METHODS. THERMAL CUTTING IS NOT PERMITTED. CUTTING OR DRILLING SIP FORMS AFTER BEING SHOP-GALVANIZED IS PROHITED, EXCEPT AS NEEDED FOR INSTALLATION USING SCREWS.
B. PLACE FORMS ON FORM SUPPORTS. DO NOT INSTALL SIP FORMS DIRECTLY TO THE BRIDGE'S STRUCTURAL MEMBERS.
C. ADJUST THE SCREED ELEVATIONS BY PRORATING THE CONCRETE DEAD LOAD DEFLECTION TO ACCOUNT FOR THE ADDITIONAL PERMANENT DEAD LOADS ASSOCIATED WITH CONCRETE FILLED STAY IN PLACE FORMS.
D. SET THE HEIGHT OF THE FORM SUPPORTS TO DEVELOP THE ADJUSTED SCREED ELEVATIONS, DECK THICKNESS AND PLAN PROFILE.
E. PLACE SIP FORMS ON FORM SUPPORTS TO ACHIEVE MINIMUM BEARING LENGTH PER MANFACTURES DESIGN.
F. CONNECT SIP FORMS TO FORM SUPPORTS BEFORE USING THE SIP AS A WORKING SURFACE AND BEFORE THE END OF EACH WORK SHIFT.





ITEM 511: CLASS QC2 CONCRETE WITH QA/QC, BRIDGE DECK, AS PER PLAN (CONTINUED):

G. PROVIDE SAFETY STOPS TO ELIMINATE HAZARDS FROM SUDDEN UPLIFT AND LATERAL MOVEMENT. AFTER THE DECK CONCRETE MEETS THE LOADING REQUIREMENTS OF C&MS 511.17, REMOVE THE VISIBLE PORTION OF ALL SAFETY STOPS.
H. COATINGS DAMAGED CAUSED BY MECHANICAL CUTTING OR FIELD WIELDING NEED NOT BE REPAIRED UNLESS SPECIFIED BY THE SIP FORM MANUFACTURER.

INSPECTION:
THE ENGINEER WILL CHECK THAT THE SIP MATERIALS MEET DESIGN REQUIREMENTS AND EVALUATE INSTALLATION BASED ON CONSTRUCTION PLAN.

BASIS OF PAYMENT:
THE DEPARTMENT WILL NOT SEPARATELY PAY FOR SIP FORMS. THE COST OF THIS WORK IS INCLUDED FOR PAYMENT IN THE PRICE BID FOR THE ITEM FOR WHICH THE SIP FORMS ARE USED.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
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DESIGNED	DRAWN	REVIEWED	DATE
MAK	MAK	MUR	09/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

GENERAL NOTES
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

3 / 37

5 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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ITEM 512 - SEALING OF CONCRETE SURFACES, AS PER PLAN:

APPLY A PERMANENT GRAFFITI COATING QUALIFIED ACCORDING TO SUPPLEMENT 1083 THAT IS COMPATIBLE WITH THE CONCRETE SEALER OVER WHICH IT IS APPLIED. APPLY THE GRAFFITI COATING IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.

THE ANTI-GRAFFITI COATING SHALL ALSO MEET THE FOLLOWING REQUIREMENTS:

THE MATERIAL SHALL BE A SINGLE COMPONENT, RTV (ROOM TEMPERATURE VULCANIZED), NEUTRAL MOISTURE CURE, PERMANENT (NON-SACRIFICIAL), TYPE III (WATER CLEANABLE) POLYSILOXANE (SILICONE) ANTI-GRAFFITI COATING (FREE OF ANY WAXES, EPOXIES, OR POLYURETHANE COMPONENTS).

THE COATING SHALL BE A ONE COAT SYSTEM (NO PRIMER) CAPABLE OF BEING SPRAY APPLIED TO A DRY FILM THICKNESS OF 15 MILS (375 MICRONS) WITHOUT RUNS OF SAGS (MULTIPLE COAT APPLICATION ACCEPTABLE FOR BRUSH/ROLLER USAGE AND PRIMER USAGE ACCEPTABLE FOR SPECIALTY SUBSTRATES SUCH AS GALVANIZED METAL).

THE COATING SHALL EMIT LESS THAN 300 G/L (2.5 POUNDS PER GALLON) OF VOLATILE ORGANIZE COMPOUNDS (EPA METHOD 24).

THE COATING SHALL MEET THE FOLLOWING PERFORMANCE REQUIREMENTS:

1. CLEANABILITY LEVEL 1 (GRAFFITI COMPLETELY REMOVED WITH COLD WATER POWER WASH) AS PER ASTM D7089 WITH LOW PRESSURE (1200 PSI) COLD WATER WASH AFTER 2000 HOURS ACCELERATED UV-CONDENSATION EXPOSURE IN ACCORDANCE WITH ASTM D4587.
2. GRAFFITI REISTANCE LESS THEN 7.5 AS PER ASTM D6578 AFTER 2000 HOURS ACCELERATED UV-CONDENSATION EXPOSURE IN ACCORDACE WITH ASTM 4578.
3. NO SIGNS OF GRAFFITI STAINING AND MUST BE INTACT AND EXHIBIT NO SIGNS OF STREAKING, CRACKING, PINHOLING, DISCOLORING, OR OTHER VISIBLE COATING DEGRADATION UPON CASUAL OBSERVATION WHEN TESTED IN ACCORDANCE WITH TXDOT TEX 890-B, TYPE III METHOD.
4. BREATHABILITY OF 10 PERMS (+/- 3) PER ASTM D1653 USING "WET CUP METHOD".
5. ELONGATION AT BREAK GREATER THAN 100% AS PER ASTM D412 (USING DIE "D").
6. ADHESION RATING OF "8" - DIFFICULT TO REMOVE AS PER ASTM D6677 (ADHESION BY KNIFE).
7. SEALING COLOR - LIGHT TAN - FEDERAL STANDARD 595C #27769

ITEM 512 - SEALING OF CONCRETE SURFACES (TEX-COTE SILANE)

ALL EXPOSED CONCRETE SURFACES OF THE ABUTMENT, INCLUDING WINGWALLS AND LIMITS OF THE CONCRTETE SUPERSTRUCTURE, AS PER PLAN DETAILS, SHALL BE SEALED WITH A TEX-COTE SILANE BASED MATERIAL.

ITEM 518 - STRUCTURE DRAINAGE, MISC.: PREFABRICATED GEOCOMPOSITE DRAIN

THIS WORK CONSISTS OF FURNISHING AND PLACING PREFABRICATED GEOCOMPOSITE DRAIN (PGD) AGAINST THE BACK FACE OF THE ABUTMENT.

ITEM 518 - STRUCTURE DRAINAGE, MISC.: PREFABRICATED GEOCOMPOSITE DRAIN (CONTINUED)

FURNISH PGD CONSISTING OF A DRAINAGE CORE WITH A GEOTEXTILE FABRIC BONDED TO AT LEAST ONE SIDE. USE CORE MATERIAL THAT CONSISTS OF A STABLE, POLYMER PLASTIC MATERIAL WITH A CUSPATED OR GEONET STRUCTURE. THE CORE MATERIAL SHALL HAVE SUFFICIENT FLEXIBILITY TO WITHSTAND BENDING AND HANDLING DURING INSTALLATION WITHOUT DAMAGE. FURNISH GEOTEXTILE COMPOSED OF STRONG ROT-PROOF POLYMERIC FIBERS FORMED INTO A WOVEN OR NON-WOVEN FABRIC. FURNISH PGD CONFORMING TO THE FOLLOWING REQUIREMENTS. FURNISH MANUFACTURER'S CERTIFIED TEST DATA.

	PROPERTY	TEST METHOD	VALUE
CORE	THICKNESS	ASTM D 5199	1.0 INCH
	COMPRESSIVE STRENGTH	ASTM D 1621	13,650 PSF MIN.
	FLOW RATE	ASTM D 4716	9 TO 25 GPM/FT
FABRIC	APPARENT OPENING SIZE	ASTM D 4751	0.3 MM MAX.
	FLOW RATE	ASTM D 4491	40 GPM/SQ.FT. MIN.
	GRAB TENSILE STRENGTH	ASTM D 4632	90 LBS MIN.
	CBR PUNCTURE	ASTM D 6241	65 LBS MIN.

PLACE PGD ALONG THE BACKFACE OF THE ABUTMENT AND WINGWALLS. PLACE THE SIDE FACED WITH GEOTEXTILE FACING TOWARDS THE RETAINED GROUND. USE NAILS AND WASHERS AT LEAST 1-INCH DIAMETER IN SIZE TO SECURE THE PGD ALONG THE EDGES OF THE PGD AND AT A MAXIMUM SPACING OF 4 FEET TO THE CONCRETE SURFACES.

SPLICE ABUTTING SECTIONS TOGETHER BY OVERLAPPING THE GEOTEXTILE FLAP (IF PROVIDED) ON ONE SECTION WITH THE ADJACENT SECTION OF PGD. OVERLAP THE GEOTEXTILE IN A SHINGLED OVERLAP SO THAT THE UPPER GEOTEXTILE IS ON TOP OF THE LOWER GEOTEXTILE. IF A GEOTEXTILE FLAP IS NOT PROVIDED, COVER THE SEAM WITH A 12-INCH WIDE STRIP OF GEOTEXTILE FABRIC CENTERED OVER THE SEAM AND SECURED IN PLACE USING 3-INCH WIDE WATERPROOF PLASTIC TAPE.

SEAL ALL EXPOSED EDGES OF THE CORE MATERIAL TO PREVENT SOIL INSTRUSION. SEAL EXPOSED EDGES BY FOLDING THE GEOTEXTILE FLAPS OVER AND AROUND THE PGD OR, IF A FLAP IS NOT PROVIDED, COVERING THE EXPOSED EDGE WITH A 12-INCH WIDE STRIP OF GEOTEXTILE FABRIC, TAPING THE STRIP TO THE PGD GEOTEXTILE 8 INCHES FROM THE EXPOSED EDGE, AND FOLDING THE REMAINING 4 INCHES OVER AND AROUND THE PGD. SECURE LOOSE EDGES OF THE GEOTEXTILE FABRIC WITH 3-INCH WIDE WATERPROOF PLASTIC TAPE.

REPAIR ANY DAMAGE TO THE GEOTEXTILE FABRIC BY COVERING WITH A PATCH WHICH OVERLAPS THE DAMAGED AREA AND EXTENDS AT LEAST 6 INCHES BEYOND THE EDGE OF THE DAMAGED AREA. TAPE THE EDGES OF THE PATCH IN PLACE USING 3-INCH WIDE WATERPROOF PLASTIC TAPE. IF THE CORE OF THE PGD IS DAMAGED, REPLACE IT WITH A NEW SECTION OF PGD AND SPLICE IT AS DESCRIBED ABOVE.

WHERE SHOWN ON THE PLANS, PLACE THE BOTTOM OF THE PGD ADJACENT TO A PERFORATED DRAINAGE COLLECTION PIPE AND POROUS BACKFILL AND COVER WITH GEOTEXTILE FABRIC. ENSURE A CONTINUOUS DRAINAGE PATH FROM THE PGD CORE TO THE PIPE. WHERE A WALL HAS WEEPHOLES FOR DRAINAGE, ENSURE WATER CAN DRAIN FROM THE PGD TO THE WEEPHOLE. IF NECESSARY, CUT A HOLE IN THE CORE TO ALLOW DRAINAGE OR USE A WEEPHOLE FITTING FROM THE PGD MANUFACTURER. DO NOT CUT GEOTEXTILE.

ITEM 607 - VANDAL PROTECTION FENCE, AS PER PLAN

THE CONTRACTOR SHALL FURNISH ALL NECESSARY LABOR, MATERIALS AND EQUIPMENT TO FABRICATE , GALVANIZE, CLEAN, APPLY A TWO-COAT SHOP PAINT SYSTEM (EPOXY/URETHANE) AND INSTALL THE RAILING. ALL FENCE AND RAILING MATERIALS SHALL BE GALVANIZED AND PAINTED PER THIS NOTE.

A. FABRICATION OF THE RAILING SHALL BE IN ACCORDANCE WITH C&MS 513, UF LEVEL. COATING OF THE RAILING SHALL BE IN ACCORDANCE WITH C&MS 514, EXCEPT AS NOTED BELOW.

B. THE ARCHITECTURAL FENCING SHALL SATISFY THE MINIMUM DESIGN REQUIREMENTS FOR POSTS AND ANCHORAGES AS SPECIFIED IN STANDARD BRIDGE DRAWING VPF-1-90 "VANDAL PROTECTION FENCE".

C. THE FENCING SHALL BE CONSTRUCTED USING WELDED WIRE FABRIC WITH 10.5 GAGE CORE WIRE, GALVANIZED AFTER WELDING.

D. STEEL PLATES AND SHAPES SHALL BE ASTM A709 GRADE 36 OR 50. ALL OTHER MATERIALS SHALL BE IN ACCORDANCE WITH C&MS 707.10 OR 711.09.

E. THE GALVANIZED COATING SYSTEM MAY BE APPLIED BY A GALVANIZER NOT PRE-QUALIFIED AS A FABRICATION SHOP UNDER SUPPLEMENT 1078, BUT THE PRE-QUALIFIED FABRICATOR OF THE STRUCTURAL STEEL SHALL BE RESPONSIBLE FOR THE QUALITY OF THE APPLIED GALVANIZED COATING SYSTEM AND ANY REPAIRS, RE-FABRICATION AND ADDITIONAL ASSEMBLIES REQUIRED TO ASSURE THE FABRICATED STEEL MEETS THE PLAN REQUIREMENTS.

F. THE TWO SHOP COATS SHALL BE APPLIED IN A STRUCTURAL STEEL FABRICATION SHOP HAVING PERMANENT BUILDINGS PER 513.04 AND PRE-QUALIFIED AT THE UF LEVEL. THE PAINT QUALITY CONTROL SPECIALIST (QCS) SHALL BE QUALIFIED AS SPECIFIED IN 514.04.

G. PRIOR TO GALVANIZING, ALL CORNERS OF THE THERMALLY CUT OR SHEARED EDGES SHALL HAVE A 1/16-INCH RADIUS OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE.

H. GALVANIZE THE FABRICATED RAILING AND HARDWARE ACCORDING TO C&MS 711.02, EXCEPT THAT FABRICATED RAILING ELEMENTS SHALL NOT BE POST TREATED WITH WATER QUENCHING OR CHROMATE CONVERSION COATED.

I. AFTER GALVANIZATION, REMOVE ZINC HIGH SPOTS SUCH AS METAL DRIP LINE AND OTHERS THAT WOULD DETRACT FROM THE PAINT APPEARANCE BY SSPC SP2 OR SP3. TAKE CARE THAT THE BASE GALVANIZED COATING IS NOT REMOVED. CHECK REPAIRED AREAS FOR REQUIRED COATING THICKNESS.

J. REPAIR GALVANIZED COATINGS DAMAGED IN THE SHOP ACCORDING TO ASTM A780 METHOD A3. REPAIR GALVANIZED COATINGS DAMAGED IN THE FIELD ACCORDING TO ASTM A780 METHOD A1.

K. AFTER REMOVING HIGH SPOTS, CLEAN THE GALVANIZED COATING ACCORDING TO SSPC SP-1. THE CLEANING SOLUTION SHALL BE AN ALKALINE SOLUTION WITH A PH RANGING FROM A MINIMUM OF 11 TO A MAXIMUM OF 12. THIS SOLUTION CAN BE APPLIED BY IMMERSION, SPRAY OR SOFT NYLON BRUSH. FOLLOW CLEANING WITH A HOT WATER OR HOT PRESSURE WASHER RINSE. SEPARATE INDIVIDUAL PIECES AND POSITION TO FACILITATE DRAINAGE AND DRYING. THE PIECES SHALL BE COMPLETELY DRY BEFORE PROCEEDING.

ITEM 607 - VANDAL PROTECTION FENCE, AS PER PLAN (CONTINUED)

L. AFTER CLEANING, ABRASIVE BLAST THE PIECES ACCORDING TO SSPC-SP7 BRUSH-OFF BLAST CLEANING. THE BLASTING OPERATION SHALL ROUGHEN THE GALVANIZED SURFACE TO AN ANGULAR SURFACE PROFILE OF 0.75 TO 1.00 MILS. SELECT THE BLASTING EQUIPMENT, TECHNIQUE AND ABRASIVE MATERIAL TO PROVIDE FOR THE SPECIFIED SURFACE PROFILE WITHOUT REMOVAL OF EXCESSIVE ZINC LAYERS. THE FINAL ZINC MILLAGE SHALL NOT BE LESS THAN 4.0 MILS. REMOVE ALL ABRASIVE RESIDUE WITH CLEAN COMPRESSED AIR OR OTHER METHODS ACCEPTABLE TO THE DEPARTMENT.

M. AFTER OBTAINING SURFACE PROFILE, SHOP APPLY A TWO COAT PAINT SYSTEM CONSISTING OF EPOXY INTERMEDIATE COAT AND A URETHANE FINISH COAT MEETING THE REQUIREMENTS OF C&MS 708.02. THE FINISH COAT SHALL MATCH FEDERAL COLOR STANDARD FS 595C-17038 BLACK. APPLY THE EPOXY COATING WITHIN 24 HOURS OF THE BRUSH-OFF BLASTING.

N. PRIOR TO FABRICATION OF THE RAILING SYSTEM, FABRICATE A SAMPLE RAILING PANEL OF A LENGTH AGREEABLE TO THE PROJECT ENGINEER WHICH INCLUDES TWO POST, ALL HARDWARE, INCIDENTALS AND COATINGS. THE PROJECT ENGINEER WILL USE THIS SAMPLE PANEL TO JUDGE ACCEPTANCE OF THE FABRICATION, COATINGS AND QUALITY CONTROL PROGRAM. AFTER THE REVIEW OF THIS SAMPLE, THE DEPARTMENT AND THE CONTRACTOR MAY AGREE UPON ANY FABRICATION, COATING, QUALITY CONTROL, OR INSTALLATION CHANGES AS A MODIFICATION TO THESE NOTES. THE FABRICATION CAN PROCEED ANY TIME AFTER THE ACCEPTANCE OF THIS SAMPLE PANEL. THE SAMPLE PANEL MAY BE INCORPORATED INTO THE FINISHED WORK AT THE DISCRETION OF THE ENGINEER.

O. REPAIR DAMAGE TO THE PAINT SYSTEM CAUSED DURING STORAGE, TRANSPORTATION, ERECTION, ACCORDING TO C&MS 514.22. EXERCISE EXTREME CARE WHILE HANDLING THE STEEL DURING ERECTION, AND DURING SUBSEQUENT CONSTRUCTION OF THE RAILING AND FENCE. INSULATE THE STEEL FROM THE BINDING CHAINS BY SOFTENERS AND PAD ALL HOOKS AND SLINGS THAT ARE USED TO HOIST/ERECT THE MEMBERS.

P. ALL FENCE ANCHORS SHALL BE CAST INTO THE PARAPET. A WASHER AND NUT SHALL BE TACK WELDED TO THE BOTTOM OF THE THREADED ROD TO AVOID THE ANCHORS PULLING LOOSE WHEN THE TEMPLATES FOR THE BASEPLATES ARE STRIPPED. FENCE ANCHORAGE SHALL BE STAINLESS STEEL PER C&MS 730.10.

Q. THE DBT SHALL DESIGN THE FENCE FOR DEAD LOAD, IN ACCORDANCE WITH AASHTO LRFD SECTION 3.8. THE WIND AREA SHALL INCLUDE THE AREA OF THE WELDED WIRE FABRIC WITHIN A GIVEN PANEL.

ITEM 840 - 6" DRAIN PIPE (NON-PERFORATED), AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF SUPPLEMENT SPEC 840, THIS ITEM SHALL CONSIST OF SUPPLYING AND PLACING ROCK CHANNEL PROTECTION, TYPE C AND ANIMAL GUARD AT THE OUTLET OF THE DRAIN PIPE AS SHOWN IN THE DETAIL ON SHEET 10/37 .

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
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DESIGNED MAK | DRAWN MAK | REVIEWED MUR | DATE 09/23/19
CHECKED JAH | REVISED | STRUCTURE FILE NUMBER TBD

RECORD PLANS

GENERAL NOTES
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

RECORD PLANS

4 / 37

6 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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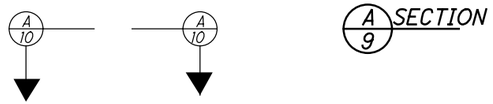
SECTION / DETAIL / VIEW CALLOUTS



(SEE SECTION A ON SHEET 10) (SECTION A CUT FROM SHEET 9)

DRILLED SHAFTS

THE MAXIMUM FACTORED LOAD TO BE SUPPORTED BY EACH DRILLED SHAFT IS 213 KIPS AT THE REAR ABUTMENT, 258 KIPS AT THE FORWARD ABUTMENT AND 244 KIPS AT THE PIERS. THESE LOADS ARE RESISTED BY SIDE RESISTANCE WITHIN A PORTION OF THE BEDROCK SOCKET AND ALSO BY TIP RESISTANCE. THE FACTORED RESISTANCE DEVELOPED BY SIDE RESISTANCE IS 88 KIPS, ASSUMED TO ACT ALONG THE BOTTOM 4 FEET OF THE BEDROCK SOCKET FOR THE REAR ABUTMENT; 106 KIPS, ASSUMED TO ACT ALONG THE BOTTOM 4 FEET OF THE BEDROCK SOCKET FOR THE FORWARD ABUTMENT; AND 106 KIPS, ASSUMED TO ACT ALONG THE BOTTOM 6 FEET OF THE BEDROCK SOCKET FOR THE PIERS. THE FACTORED RESISTANCE PROVIDED BY THE DRILLED SHAFT TIP IS 129 KIPS AT THE REAR ABUTMENT, 370 KIPS AT THE FORWARD ABUTMENT, AND 140 KIPS AT THE PIERS.

PARTIAL PAINTING OF A709 GRADE 50W STEEL

PAINT THE LAST 10 FT OF EACH BEAM/GIRDER END ADJACENT TO THE ABUTMENTS INCLUDING ALL CROSS FRAMES AND OTHER STEEL WITHIN THESE LIMITS. THE FINISH COAT SHALL MEET FEDERAL STANDARD NO. 595B - 20045 OR 20059 (THE COLOR OF WEATHERING STEEL).

COARSE AGGREGATE FOR CONCRETE

ALL COARSE AGGREGATE SHALL HAVE AN ABSORPTION OF 1 PERCENT OR GREATER AS DEFINED BY THE AMERICAN SOCIETY OF TESTING MATERIALS (ASTM) C127.

CONSTRUCTION OVER GCRTA TRACKS:

GCRTA REQUIREMENTS:

A. NO WORK EQUIPMENT SHALL EVER ACCESS AND/OR CROSS THE TRACKS WITHOUT A TEMPORARY GRADE CROSSING AND/OR TEMPORARY CRIBBING TO PROTECT THE RAIL FROM DAMAGE.
B. NO EQUIPMENT SHOULD EVER RUN ON THE ENDS OF TIES.
C. PROTECTION OF THE RTA TRACK STRUCTURE (RAIL, BALLAS, TIES), OVERHEAD CATENARY SYSTEM (WIRE AND STRUCTURES INCLUDING FEEDER CABLES, FIBER OPTIC, SIGNAL CABLES, ETC.) FROM DAMAGE IS PARAMOUNT.
D. FABRIC TO BE OF TYPE AND PLACEMENT TO PREVENT AND MINIMIZE DEMO DEBRIS CONTAMINATION OF THE TRACK BALLAST.
E. IDENTIFY HOW FEEDER CABLE, FIBER OPTIC, OCS AND TRACKS WILL BE PROTECTED DURING CONSTRUCTION.

CONTRACTOR WILL COMPLY WITH THE LATEST REVISIONS OF THE FOLLOWING GCRTA STANDARDS.

SECTION 014500 - SAFETY PROCEDURES
SECTION 015010 - MAINTENANCE OF RAIL TRAFFIC AND RESUMPTION OF REVENUE SERVICE
SECTION 015020 - STANDARD RAIL FLAGGING

CONSTRUCTION CLEARANCE

MAINTAIN A CONSTRUCTION CLEARANCE OF 12 FEET HORIZONTALLY FROM THE CENTER OF TRACKS AND 19.5 FEET VERTICALLY FROM A POINT LEVEL WITH THE TOP OF THE HIGHER RAIL, AND 8.5 FEET FROM THE CENTER OF TRACKS, AT ALL TIMES. TOP OF TEMPORARY SHEETING, IF REQUIRED, SHALL BE PLACED BELOW THE BOTTOM OF ADJACENT TIES.

PRE-CONSTRUCTION SURVEY, VIBRATION MONITORING, AND VIDEO INSPECTION OF SEWERS

CONDUCT A PRE-CONSTRUCTION SURVEY ACCORDING TO THE SETTLEMENT AND VIBRATION MONITORING PLAN OF BUILDINGS, STRUCTURES, UTILITIES, AND CRITICAL LOCATIONS WITHIN THE LIMITS DETERMINED BY THE DBT VIBRATION SPECIALIST. PERFORM A PRE-CONSTRUCTION VIDEO INSPECTION ACCORDING TO CMS 611 OF ALL SEWERS WITHIN THE INFLUENCE ZONES OF CONSTRUCTION. PERFORM SETTLEMENT AND VIBRATION MONITORING ACCORDING TO THE SETTLEMENT AND VIBRATION MONITORING PLAN DURING CONSTRUCTION. AFTER

CONSTRUCTION IS SUBSTANTIALLY COMPLETE, PERFORM A SECOND VIDEO INSPECTION OF THE SEWERS. PROVIDE RECORDINGS OF THE VIDEOS TO THE DEPARTMENT AND MAINTAINING AGENCY FOR REVIEW.

NORFOLK SOUTHERN RAILROAD:

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ENGINEER PUBLIC IMPROVEMENTS
NORFOLK SOUTHERN CORPORATION
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ALL WORK TO BE PERFORMED ON, OVER, UNDER, OR ADJACENT TO THE RAILROAD RIGHT-OF-WAY SHALL COMPLY WITH THE NORFOLK SOUTHERN RAILWAY COMPANY PUBLIC PROJECTS MANUAL (APPENDIX E, SPECIAL PROVISIONS FOR THE PROTECTION OF RAILWAY INTERESTS, AND APPENDIX H1, OVERHEAD GRADE SEPARATION DESIGN CRITERIA). WHEN IN CONFLICT WITH OTHER PROJECT SPECIFICATIONS, THE MOST STRINGENT ONE SHALL APPLY.

THE RAILROAD WILL BE PROVIDED AS-BUILT DRAWINGS SHOWING THE ACTUAL CLEARANCES AS CONSTRUCTED. DEPTH, SIZE, AND LOCATION OF ALL FOUNDATION COMPONENTS SHALL BE SHOWN ON THE DRAWINGS.

"ONE CALL" SERVICES DO NOT LOCATE BURIED RAILROAD SIGNAL AND COMMUNICATIONS LINES. THE CONTRACTOR SHALL CONTACT THE RAILROAD'S REPRESENTATIVE 2 DAYS IN ADVANCE OF WORK AT THOSE PLACES WHERE EXCAVATION, PILE DRIVING, OR HEAVY LOADS MAY DAMAGE THE RAILROAD'S UNDERGROUND FACILITIES. UPON REQUEST FROM THE CONTRACTOR OR SPONSOR, RAILROAD FORCES WILL LOCATE AND PAINT MARK OR FLAG THE RAILROAD'S UNDERGROUND FACILITIES. (SEE NS PUBLIC PROJECTS MANUAL, APPENDIX E, SECTION 3.D).

FOR PROJECTS REQUIRING MORE THAN 30 CONSECUTIVE DAYS OF FLAGGING, CONTRACTOR SHALL PROVIDE THE FLAGMAN A SMALL WORK AREA WITH A DESK/COUNTER AND CHAIR WITHIN THE FIELD/SITE TRAILER, INCLUDING THE USE OF BATHROOM FACILITIES, WHERE THE FLAGMAN CAN CHECK IN/OUT WITH THE PROJECT AND THE FLAGMAN'S HOME TERMINAL. THE WORK AREA SHOULD PROVIDE ACCESS TO TWO (2) ELECTRICAL OUTLETS FOR RECHARGING RADIO(S), AND A LAPTOP COMPUTER; AND HAVE THE ABILITY TO PRINT OFF NEEDED DOCUMENTATION AND ORDERS AS NEEDED AT THE FIELD/SITE TRAILER. THIS SHOULD AID IN MAXIMIZING THE FLAGMAN'S TIME AND EFFICIENCY ON THE PROJECT.

PROPOSED PROJECT WILL NOT CHANGE THE QUANTITY AND/OR CHARACTER OF FLOW IN THE RAILWAY'S DITCHES AND/OR DRAINAGE STRUCTURES.

ITEM NO.	ITEM DESCRIPTION
202	STRUCTURE REMOVED AS PER PLAN
202	FENCE REMOVED
203	EMBANKMENT, AS PER PLAN
203	GRANULAR MATERIAL, TYPE B
503	COFFERDAMS AND EXCAVATION BRACING
503	UNCLASSIFIED EXCAVATION
509	EPOXY COATED REINFORCING STEEL
511	CLASS QC1 CONCRETE WITH QC/QA, ABUTMENT INCLUDING FOOTING
511	CLASS QC1 CONCRETE WITH QC/QA, PIER ABOVE FOOTING
511	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK, AS PER PLAN
511	CLASS QC2 CONCRETE WITH QC/QA, BRIDGE DECK (PARAPET), AS PER PLAN
511	CLASS QC2 CONCRETE, MISC.: PYLONS WITH QC/QA
512	SEALING OF CONCRETE SURFACES (NON-EPOXY)
512	SEALING OF CONCRETE SURFACES (EPOXY-URETHANE)
512	SEALING OF CONCRETE SURFACES, AS PER PLAN
513	STRUCTURAL STEEL MEMBERS, LEVEL 3
513	WELDED STUD SHEAR CONNECTORS
514	FIELD PAINTING STRUCTURAL STEEL, INTERMEDIATE COAT, AS PER PLAN
514	FIELD PAINTING STRUCTURAL STEEL, FINISH COAT, AS PER PLAN
514	FINAL INSPECTION REPAIR
516	STRUCTURAL EXPAINSION JOINT INCLUDING ELASTOMERIC STRIP SEAL
516	ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND LOAD PLATE (NEOPRENE)
518	6" PERFORATED PIPE, INCLUDING SPECIALS
518	6" NON-PERFORATED PIPE, INCLUDING SPECIALS
518	STRUCTURE DRAINAGE, MISC.: PREFABRICATED GEOCOMPOSITE DRAIN
518	POROUS BACKFILL WITH GEOTEXTILE FABRIC
519	PATCHING CONCRETE STRUCTURE
524	DRILLED SHAFT 30" DIAMETER, INTO BEDROCK
524	DRILLED SHAFT 36" DIAMETER, INTO BEDROCK
524	DRILLED SHAFT 42" DIAMETER, INTO BEDROCK
530	SPECIAL - SUPERSTRUCTURE UTILITY SUPPORTS
601	CRUSHED AGGREGATE SLOPE PROTECTION
607	VANDAL PROTECTION FENCE, AS PER PLAN
625	CONDUIT, MISC.: 5" ELECTRICAL CONDUITS
625	CONDUIT, MISC.: 2" CONDUIT IN PARAPET
625	STRUCTURE GROUNDING SYSTEM
625	JUNTION BOX
840	MECHANICALLY STABILIZED EARTH WALL, AS PER PLAN
840	WALL EXCAVATION
840	FOUNDATION PREPARATION
840	SELECT GRANULAR BACKFILL
840	NATURAL SOIL
840	6" DRAIN PIPE, PERFORATED
840	6" DRAIN PIPE, NON-PERFORATED, AS PER PLAN
840	CONCRETE COPING
840	ON-SITE ASSISTANCE
840	SGB INSPECTION AND COMPACT TESTING

ABBREVIATIONS

ABUT. - ABUTMENT
APPROX. - APPROXIMATE
℄ - BASELINE
B.F. - BACK FACE
BM - BENCHMARK
BOT. OR BTM. - BOTTOM
BRG. - BEARING
BUND. - BUNDLED
℄ - CENETERLINE
C/C - CENTER TO CENTER
C.I.P. - CAST-IN-PLACE
CJ - CONSTRUCTION JOINT
CLR. - CLEAR
CMS - CONSTRUCTION AND MATERIAL SPECIFICATIONS
CONC. - CONCRETE
CONSTR. - CONSTRUCTION
CVN - CHARPY V-NOTCH
DIA. - DIAMETER
DIM. - DIMENSION
DWG. - DRAWING
E - EAST
EB - EASTBOUND
E.F. - EACH FACE
EL. OR ELEV. - ELEVATION
EOP - EDGE OF PAVEMENT
EQ. - EQUAL
EST. - ESTIMATED
E.W. - EACH WAY
EX. - EXISTING
EXP. - EXPANSION
F.A. - FORWARD ABUTMENT
F/F - FACE TO FACE
F.F. - FAR FACE
FT. - FOOT OR FEET
FWD. - FORWARD
HMWM - HIGH MOLECULAR WEIGHT METHACRYLATE
HW - HIGH WATER
IN. - INCH
JT. - JOINT
L.F. - LEFT FORWARD
LT. - LEFT
MAX. - MAXIMUM
MIN. - MINIMUM
MISC. - MISCELLANEOUS
MSE - MECHANICALLY STABILIZED EARTH
NB - NORTHBOUND
N.F. - NEAR FACE
NO. - NUMBER
NPCPP - NON-PERFORATED CORRUGATED PLASTIC PIPE
NSRR - NORFOLK SOUTHERN RAILROAD
O/O - OUT TO OUT
PCPP - PERFORATED CORRUGATED PLASTIC PIPE
P.E.J.F. - PREFORMED EXPANSION JOINT FILLER
PR. - PROPOSED
PSF - POUNDS PER SQUARE FOOT
P.V.I. - POINT OF VERTICAL INTERSECTION
R.A. - REAR ABUTMENT
RCP - ROCK CHANNEL PROTECTION
REQD. - REQUIRED
R.F. - RIGHT FORWARD
R.R. - RAILROAD
RT. - RIGHT
R/W - RIGHT OF WAY
SB - SOUTHBOUND
SER. - SERIES
SHLDR - SHOULDER
SPA. - SPACE OR SPACES
STA. - STATION
STD. - STANDARD
STR - STRAIGHT
T -TOP
T&B - TOP & BOTTOM
TBR - TO BE REMOVED
TEMP. - TEMPORARY
T/R - TOP OF ROCK
T/S - TOE OF SLOPE
T/T - TOE TO TOE
TYP. - TYPICAL
U.N.O. - UNLESS NOTED OTHERWISE
VAR. - VARIES
V - VELOCITY
W/ - WITH
WB - WESTBOUND
WW - WINGWALL
WWR - WELDED WIRE REINFORCEMENT

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

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JAH		N/A	

RECORD PLANS

GENERAL NOTES
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

5 / 37

7
39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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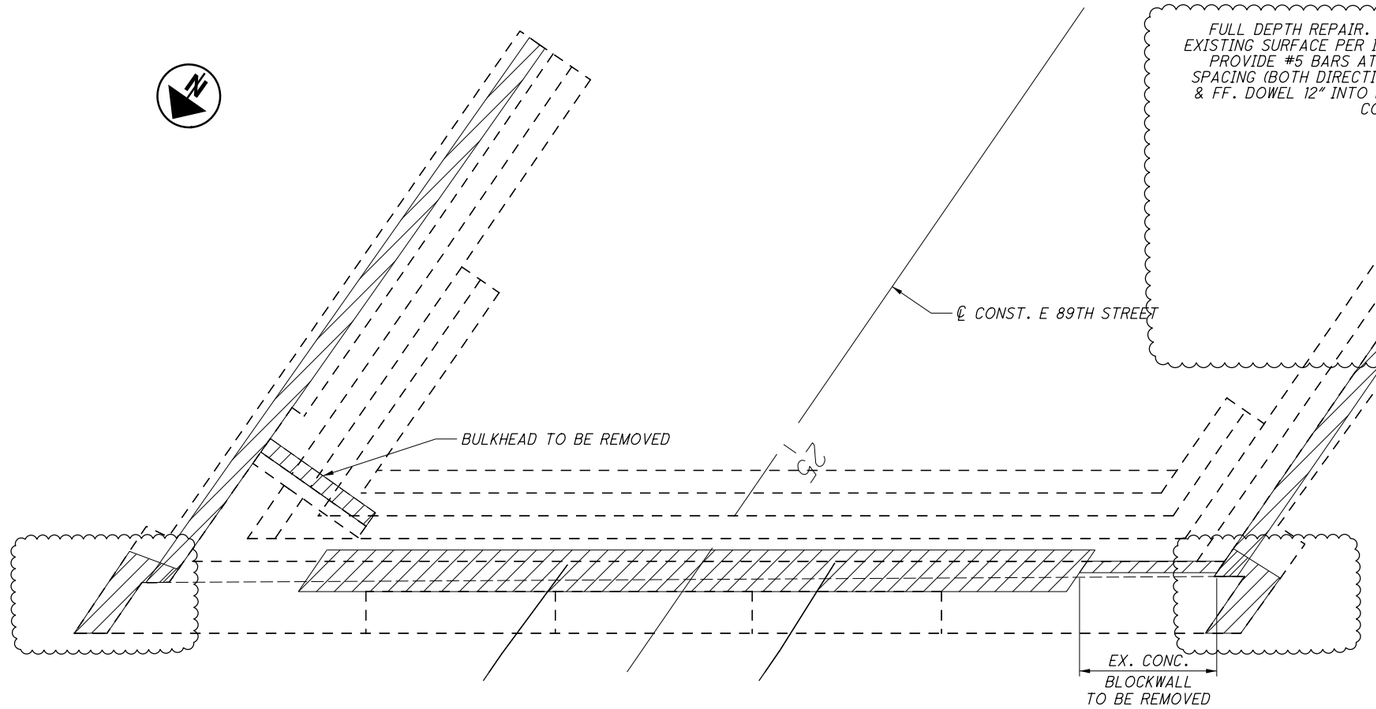
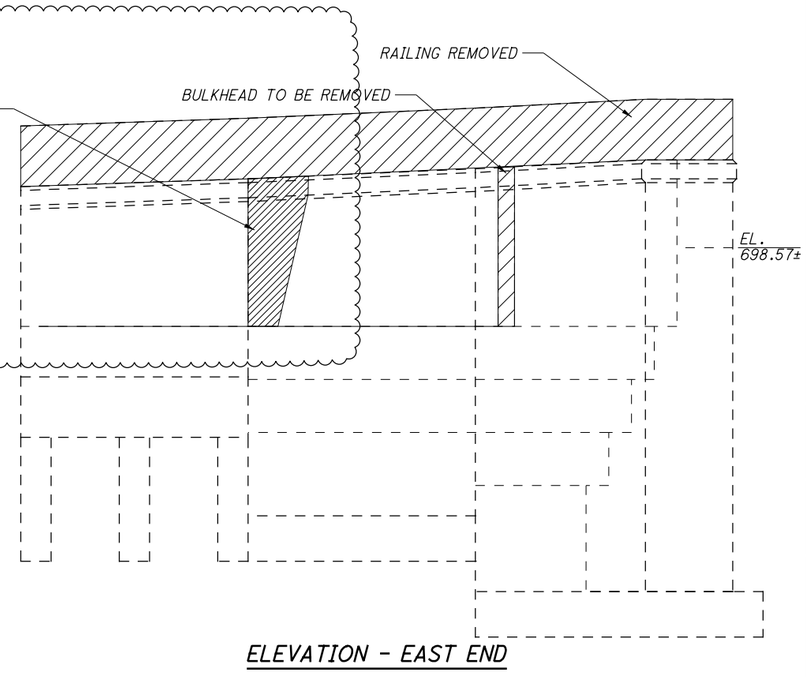
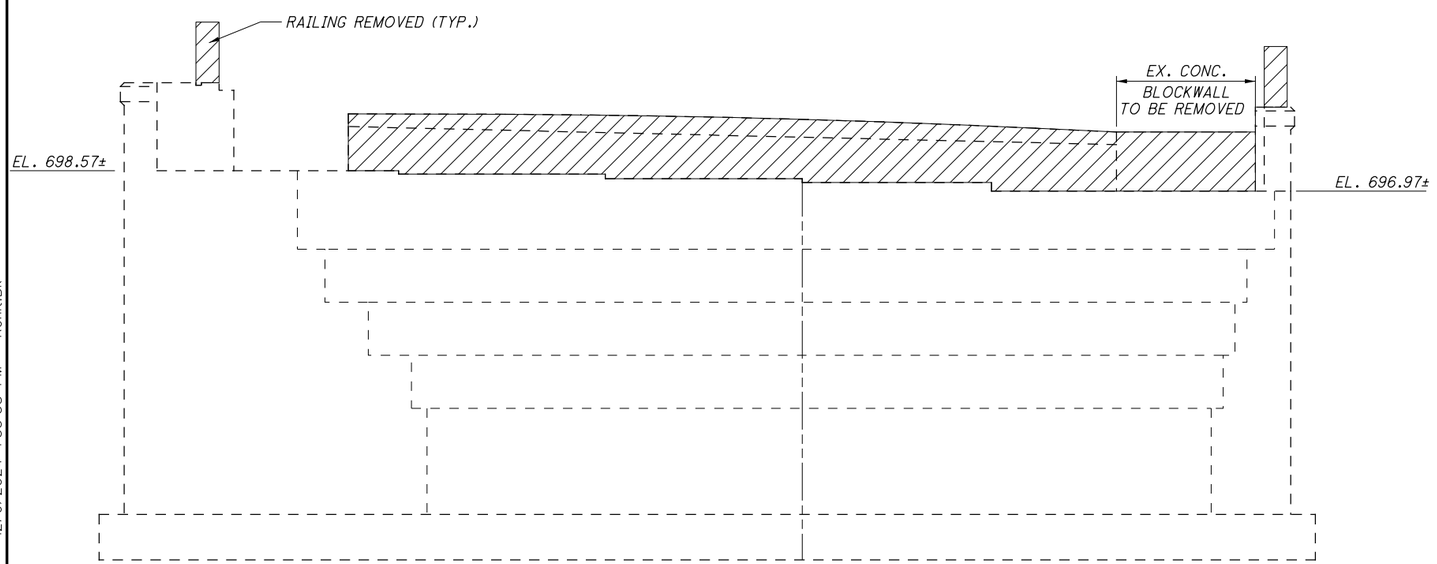


PLAN - EXISTING REAR ABUTMENT

(ALL DIMENSIONS MEASURED ALONG ℄ BEARING)

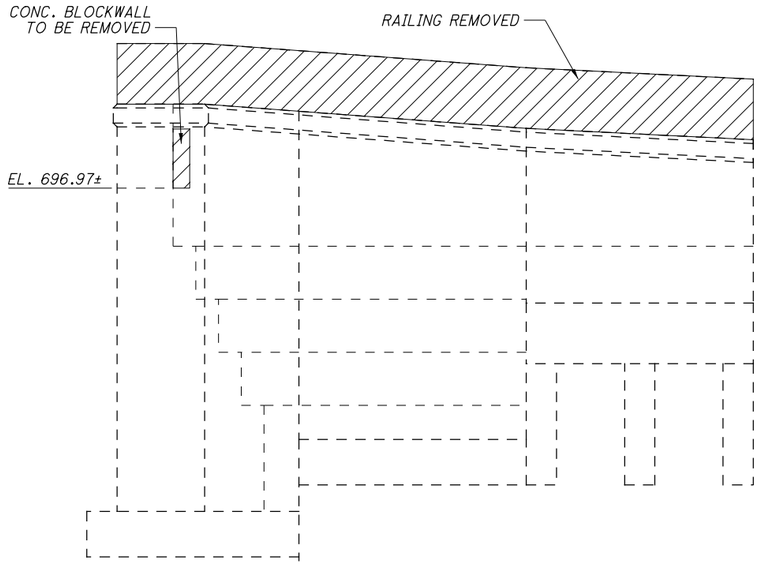


ELEVATION - EAST END



ELEVATION - EXISTING REAR ABUTMENT

(ALL DIMENSIONS MEASURED ALONG FRONT FACE OF ABUTMENT)



ELEVATION - WEST END

LEGEND:

LIMITS OF REMOVAL PER ITEM 202 - PORTIONS OF STRUCTURE REMOVED.

NOTES:

1. ALL EXISTING ELEVATIONS AND DIMENSIONS ARE ±.

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

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RECORD PLANS

EXISTING REAR ABUTMENT REMOVAL
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

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8 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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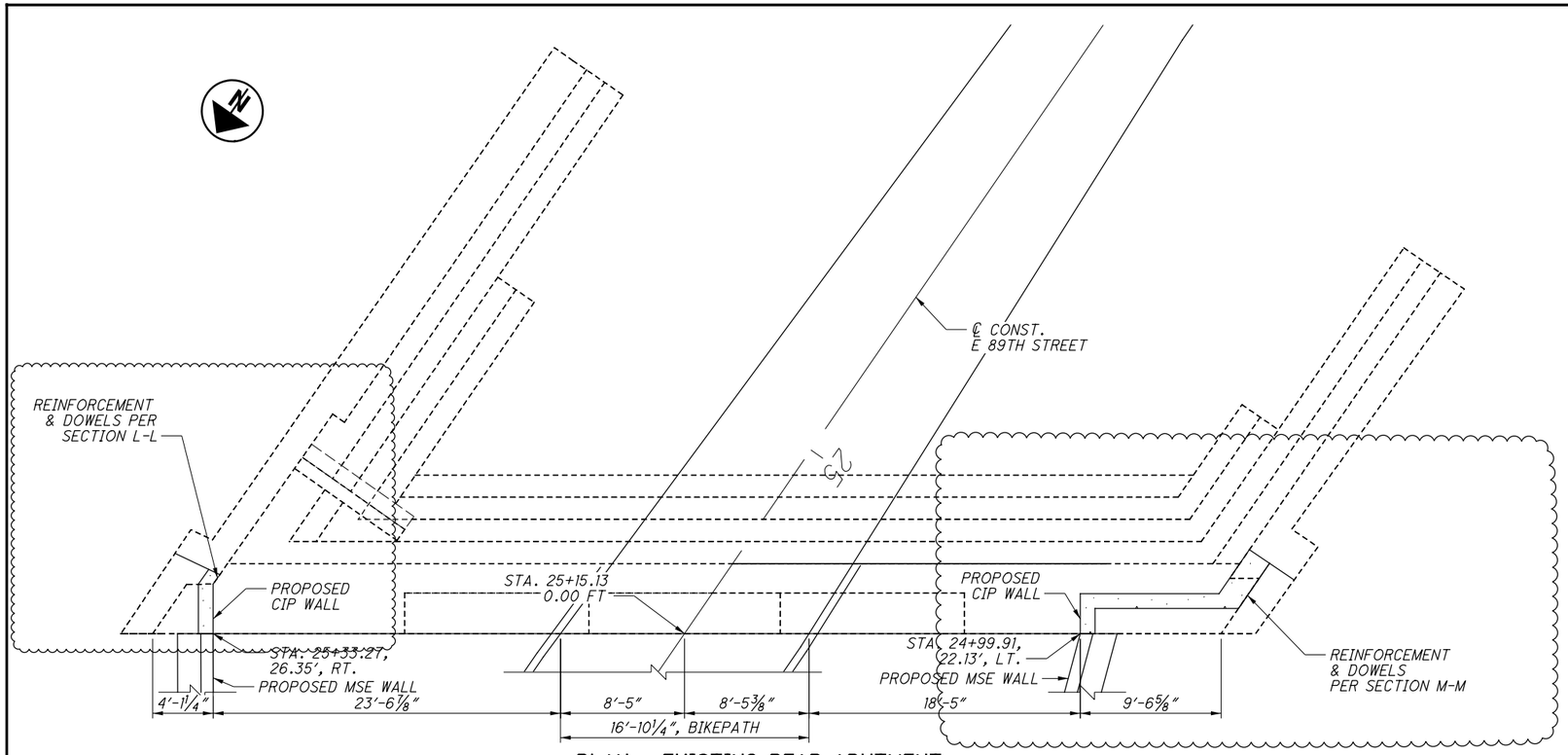
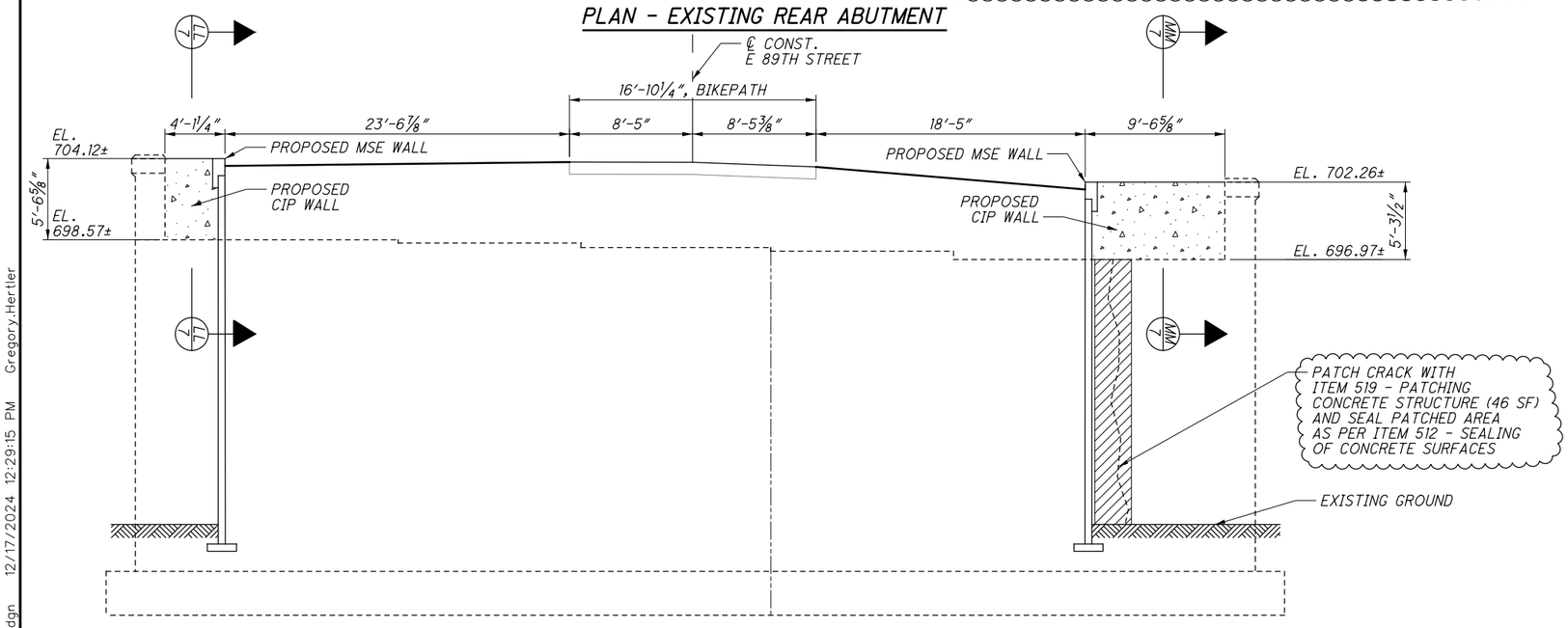
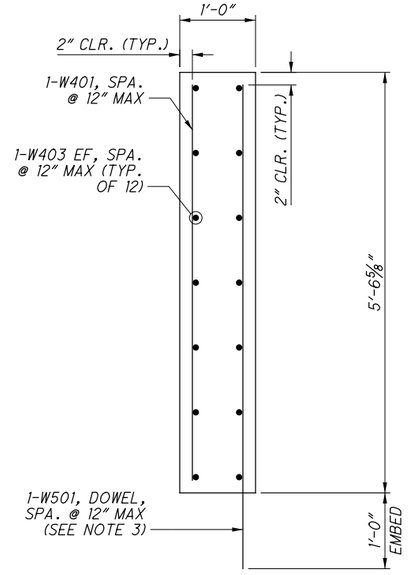


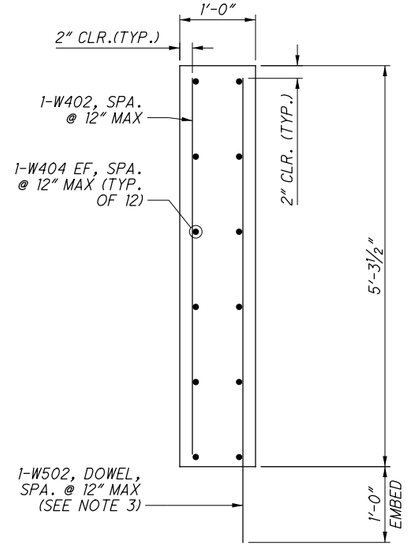
PLAN - EXISTING REAR ABUTMENT



ELEVATION - EXISTING REAR ABUTMENT



LL/7 SECTION



MM/7 SECTION

LEGEND:

ITEM 519 - PATCHING CONCRETE STRUCTURE

NOTES:

1. ALL EXISTING ELEVATIONS AND DIMENSIONS ARE ±.
2. SEE SHEETS 10/37 AND 13/37 FOR MSE WALL DETAILS.
3. DOWELS SHALL BE GROUTED WITH NON-SHRINK, NON-METALLIC GROUT AS PER CMS 705.20.
4. SEE SHEET 36/37 FOR REINFORCING SCHEDULE.

NO.	DATE	DESCRIPTION
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0	2019-09-30	RFC

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RECORD PLANS

EXISTING REAR ABUTMENT
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

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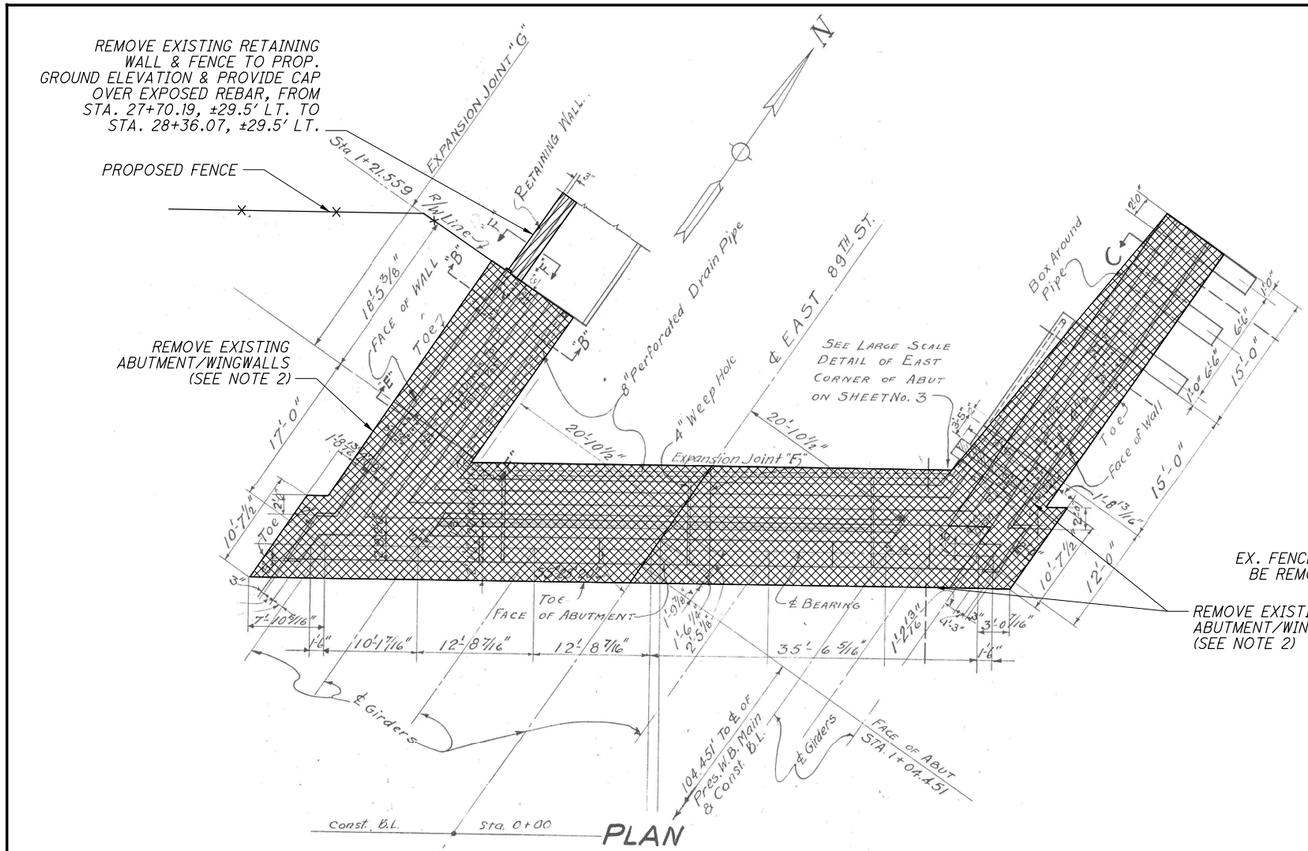
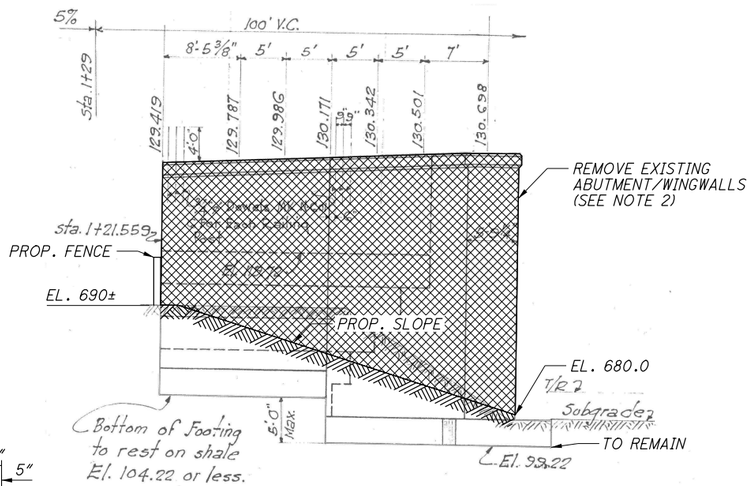
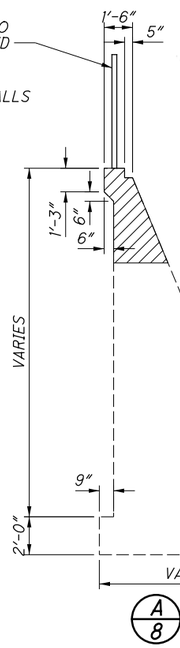
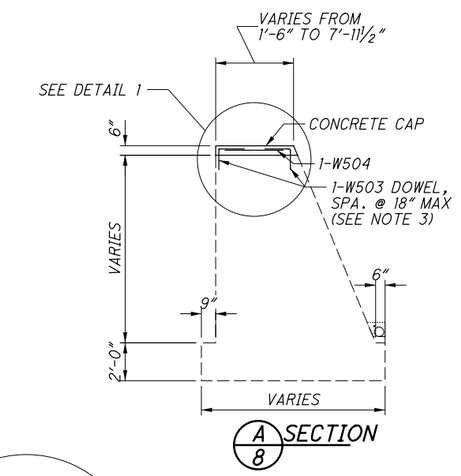


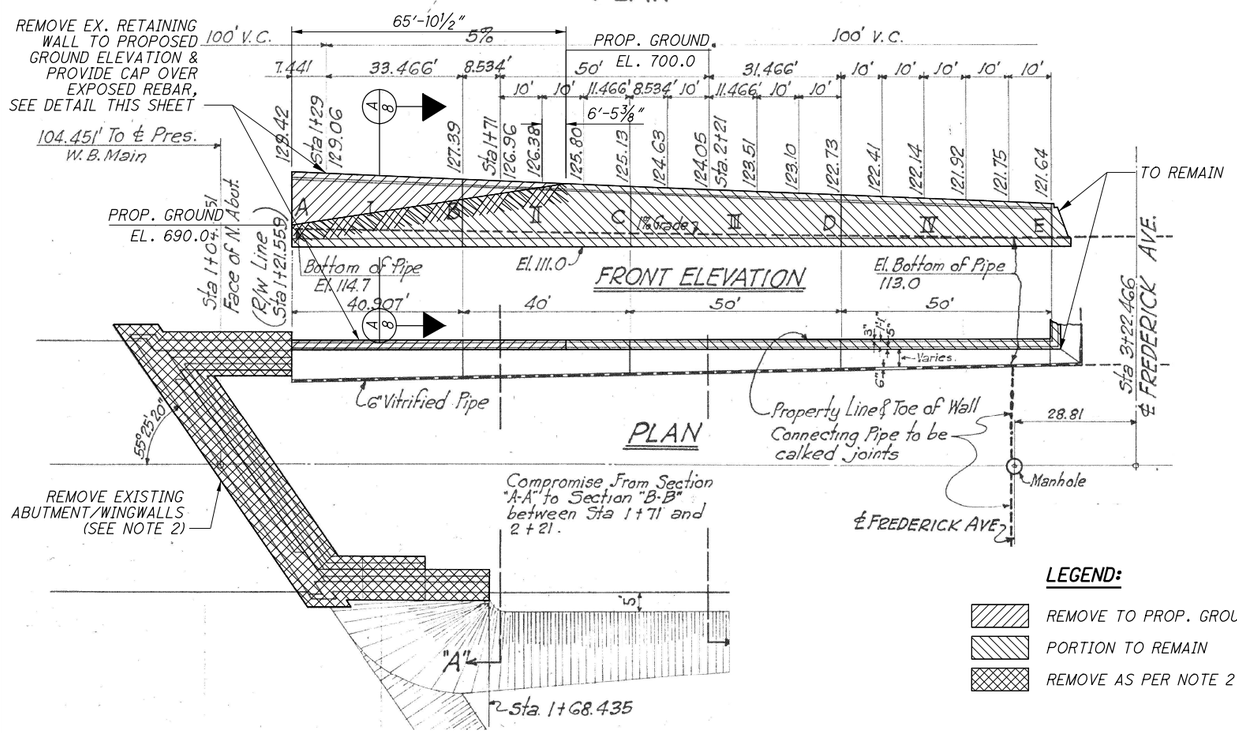


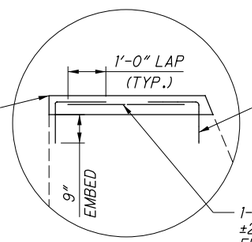


(PRIOR TO REMOVAL)



(SHOWN AFTER REMOVAL)





DETAIL 1

LEGEND:

- REMOVE TO PROP. GROUND ELEVATION
- PORTION TO REMAIN
- REMOVE AS PER NOTE 2

NOTES:

1. ALL EXISTING ELEVATIONS AND DIMENSIONS ARE ±.
2. EX. FORWARD ABUTMENT & WINGWALLS TO BE REMOVED FOLLOWING ODOT CMS 202.03.
3. DOWELS SHALL BE GROUTED WITH NON-SHRINK, NON-METALLIC GROUT AS PER CMS 705.20.
4. SEE SHEET 36/37 FOR REINFORCING SCHEDULE.

NO.	DATE	DESCRIPTION
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RECORD PLANS

FORWARD ABUTMENT REMOVAL
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
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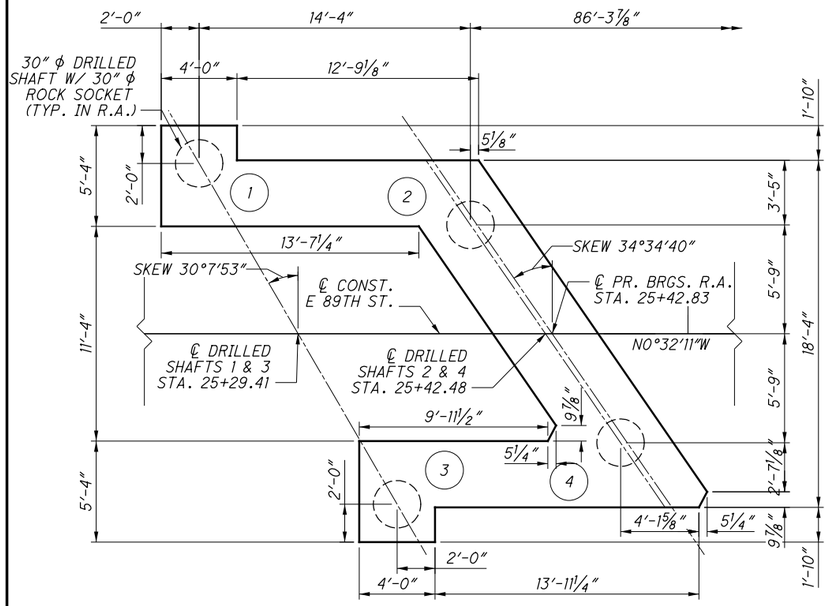
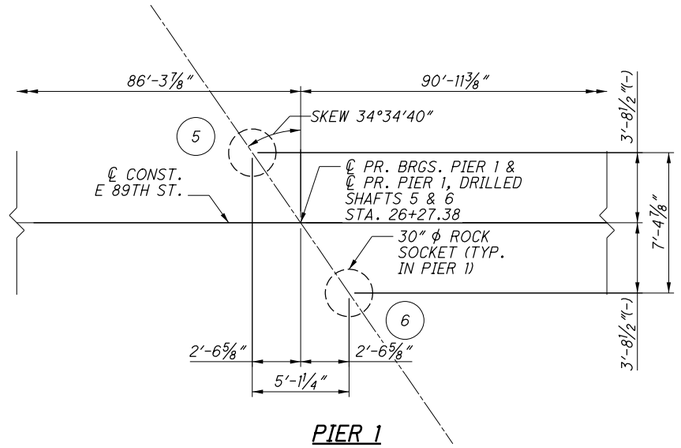
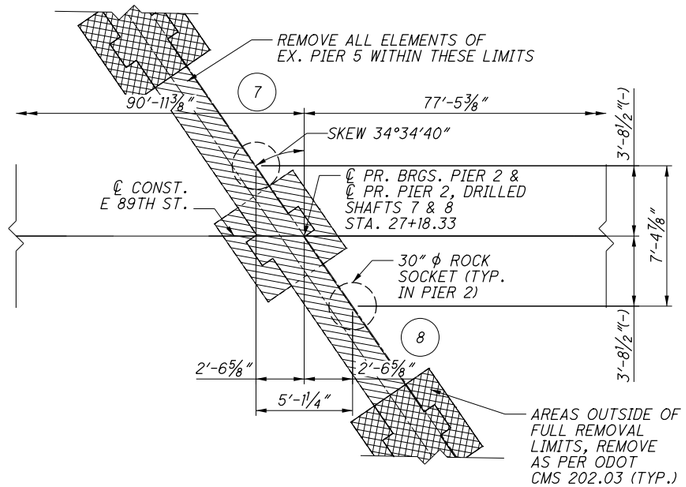


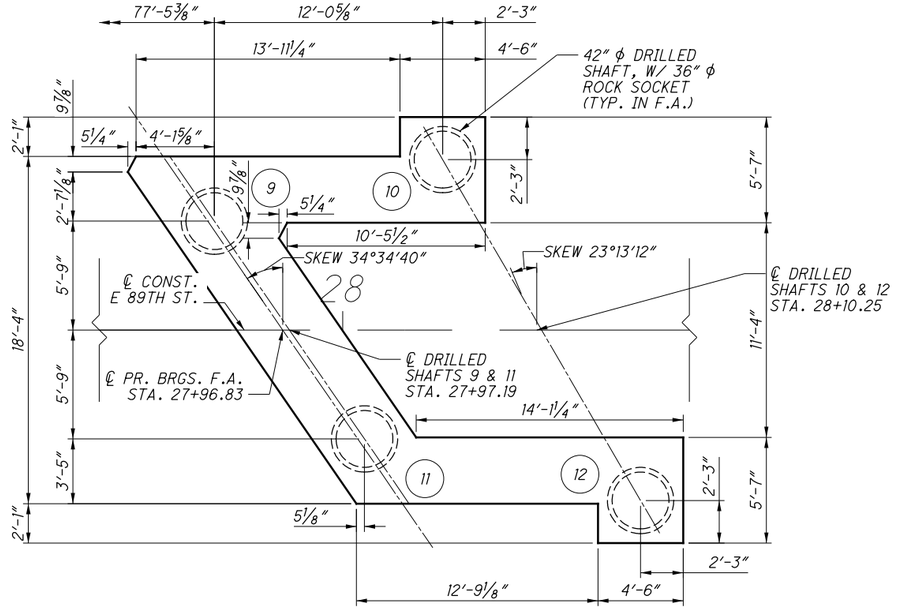
REAR ABUTMENT



PIER 1



PIER 2



FORWARD ABUTMENT

LEGEND:

(XX) PROPOSED DRILLED SHAFT/ROCK SOCKET NUMBER

EX. PIER 5, FULL REMOVAL LIMITS

EX. PIER 5, LIMITS FOR REMOVAL AS PER ODOT CMS 202.03 AND ITEM 202 - STRUCTURE REMOVED, AS PER PLAN

NOTES:

1. ESTIMATED SHAFT LENGTHS:
   R.A. = 19'-0" SHAFT + 6'-0" ROCK SOCKET
   PIER 1 = 8'-0" ROCK SOCKET
   PIER 2 = 8'-0" ROCK SOCKET
   F.A. = 12' SHAFT + 6'-0" ROCK SOCKET

2. REMOVALS AS PER ITEM 202 - STRUCTURE REMOVED, AS PER PLAN: EXISTING PIERS 1 THROUGH 4 AND PORTIONS OF PIER 5 THAT ARE OUTSIDE OF THE FULL REMOVAL LIMITS SHALL BE REMOVED AS PER ODOT CMS 202.03, WITH THE EXCEPTION THAT THE PIERS SHALL BE REMVOED TO A SUFFICIENT DEPTH BELOW GRADE TO ENABLE RESTORATION OF THE EXISTING TRACK DITCH, BUT IN NO CASE LESS THAN 2 FEET BELOW FINAL GRADE.

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RECORD PLANS

FOUNDATION PLAN
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

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BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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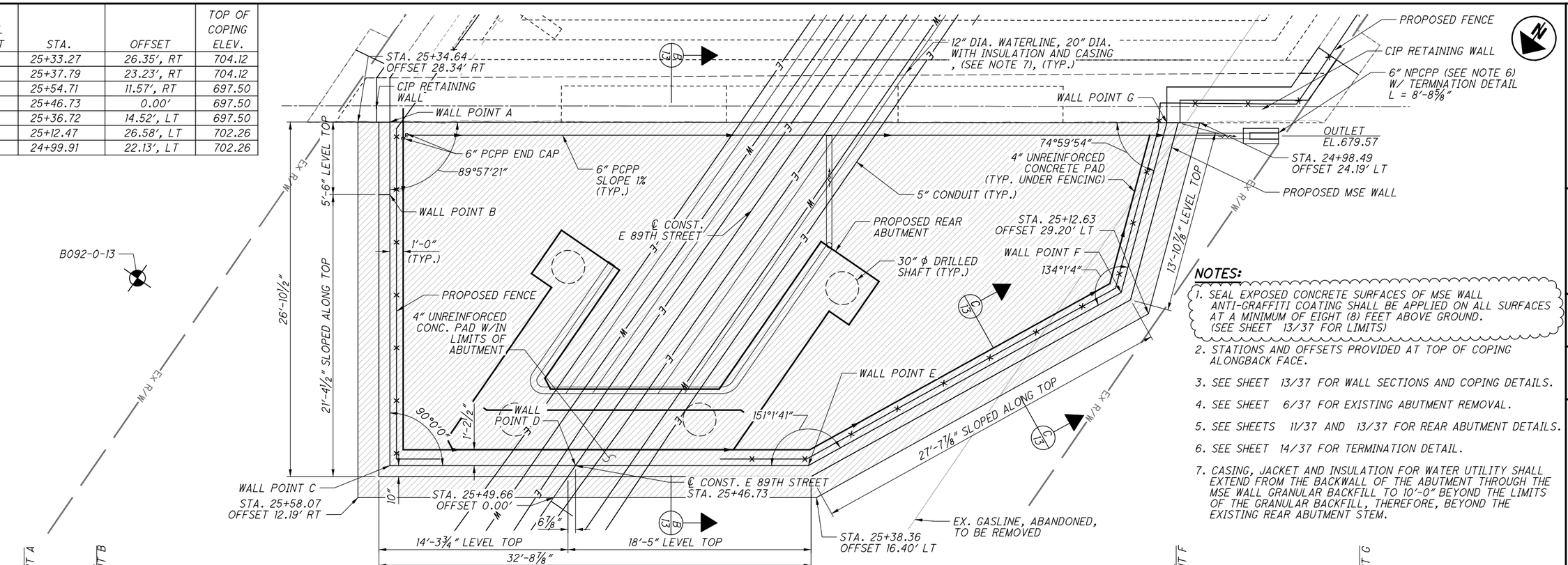
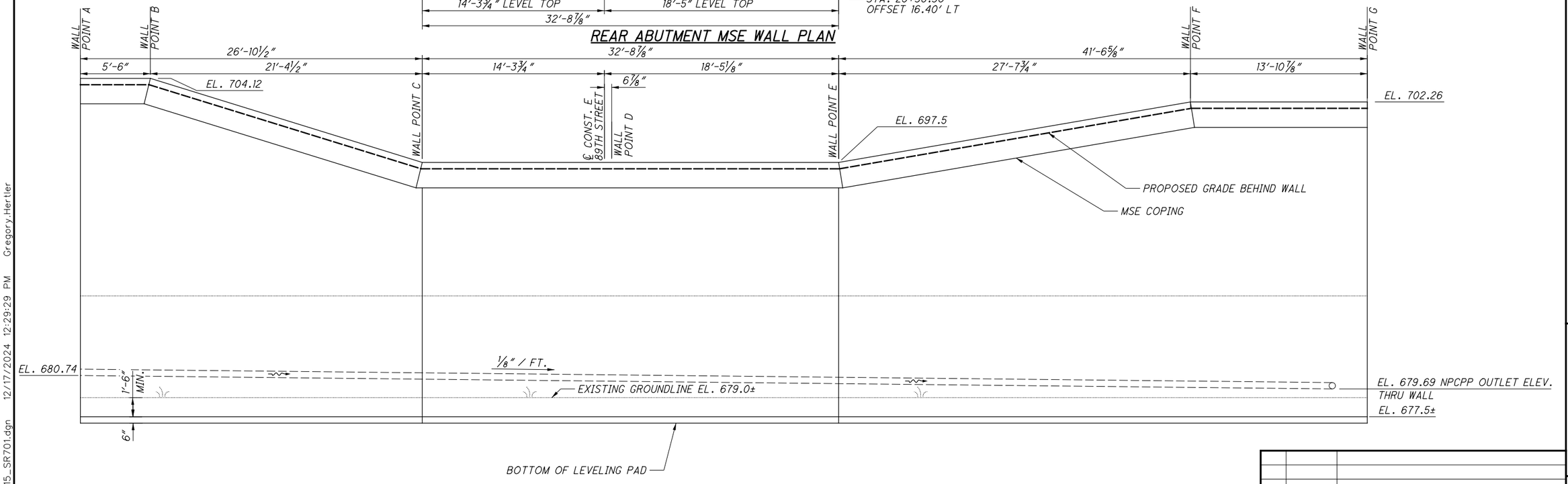
WALL POINT	STA.	OFFSET	TOP OF COPING ELEV.
A	25+33.27	26.35', RT	704.12
B	25+37.79	23.23', RT	704.12
C	25+54.71	11.57', RT	697.50
D	25+46.73	0.00'	697.50
E	25+36.72	14.52', LT	697.50
F	25+12.47	26.58', LT	702.26
G	24+99.91	22.13', LT	702.26



REAR ABUTMENT MSE WALL PLAN



REAR ABUTMENT MSE WALL DEVELOPED ELEVATION

ABUTMENT NOT SHOWN FOR CLARITY

NOTES:

1. SEAL EXPOSED CONCRETE SURFACES OF MSE WALL ANTI-GRAFFITI COATING SHALL BE APPLIED ON ALL SURFACES AT A MINIMUM OF EIGHT (8) FEET ABOVE GROUND. (SEE SHEET 13/37 FOR LIMITS)
2. STATIONS AND OFFSETS PROVIDED AT TOP OF COPING ALONGBACK FACE.
3. SEE SHEET 13/37 FOR WALL SECTIONS AND COPING DETAILS.
4. SEE SHEET 6/37 FOR EXISTING ABUTMENT REMOVAL.
5. SEE SHEETS 11/37 AND 13/37 FOR REAR ABUTMENT DETAILS.
6. SEE SHEET 14/37 FOR TERMINATION DETAIL.
7. CASING, JACKET AND INSULATION FOR WATER UTILITY SHALL EXTEND FROM THE BACKWALL OF THE ABUTMENT THROUGH THE MSE WALL GRANULAR BACKFILL TO 10'-0" BEYOND THE LIMITS OF THE GRANULAR BACKFILL, THEREFORE, BEYOND THE EXISTING REAR ABUTMENT STEM.

LEGEND:

= PLAN BOUNDARY FOR ITEMS INCLUDED WITH MSE WALL FOR PAYMENT

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
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RECORD PLANS

REAR ABUTMENT MSE WALL
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

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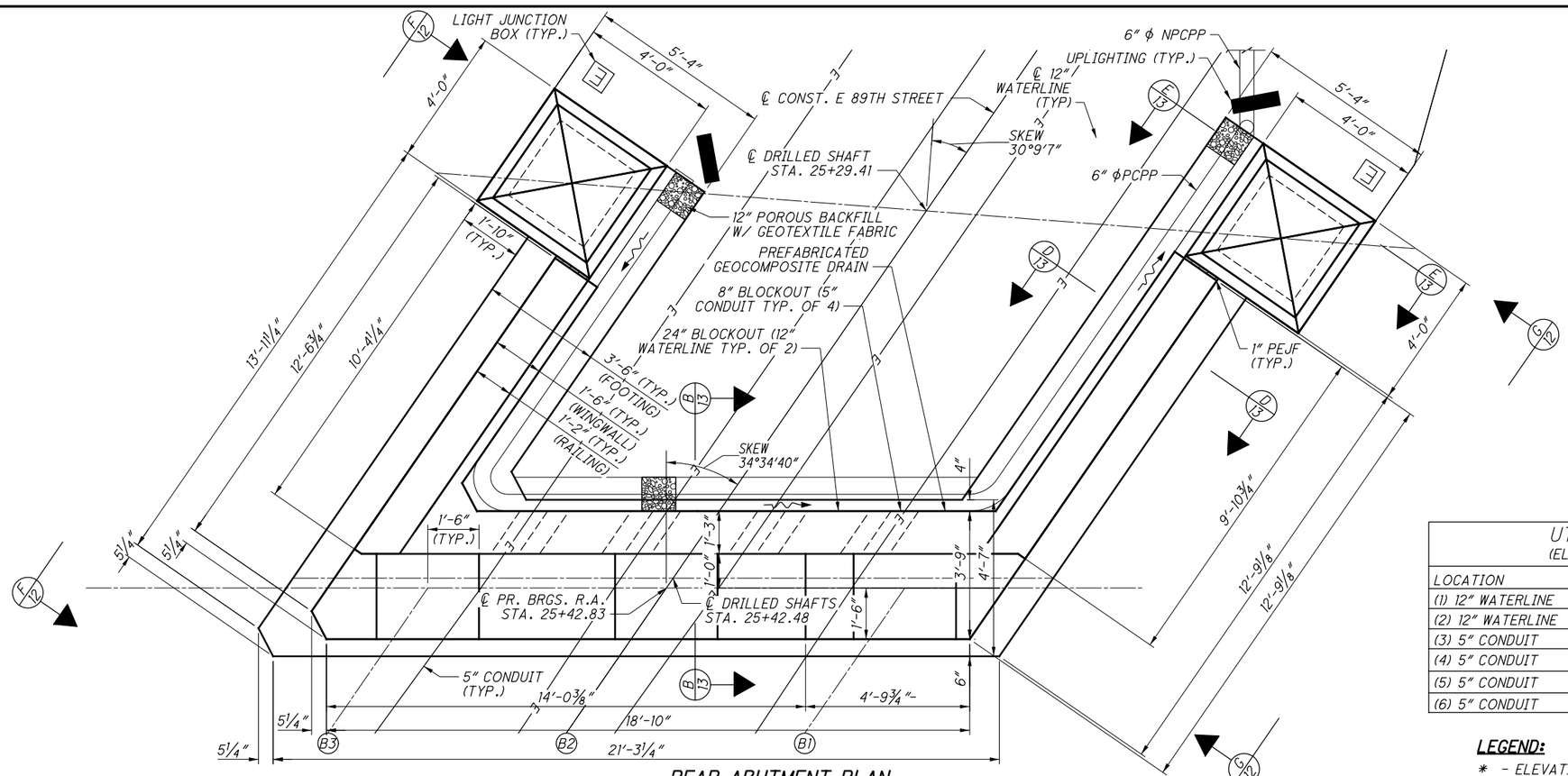


REAR ABUTMENT PLAN

(MSE WALL & DRILLED SHAFTS NOT SHOWN FOR CLARITY)

MIN. LAP LENGTH	
# 6	3'-10"

UTILITY ℄ INFORMATION
(ELEVATIONS PROVIDED AT INVERT)

LOCATION	ELEVATIONS	STATION	OFFSET
(1) 12" WATERLINE	701.25	25+39.63	2.88' LT
(2) 12" WATERLINE	701.37	25+43.60	2.88' RT
(3) 5" CONDUIT	700.91	25+38.53	4.47' LT
(4) 5" CONDUIT	701.03	25+40.74	1.27' LT
(5) 5" CONDUIT	701.08	25+42.48	4.47' RT
(6) 5" CONDUIT	701.09	25+44.70	1.27' RT

LEGEND:

* - ELEVATIONS PROVIDED ALONG BACKWALL

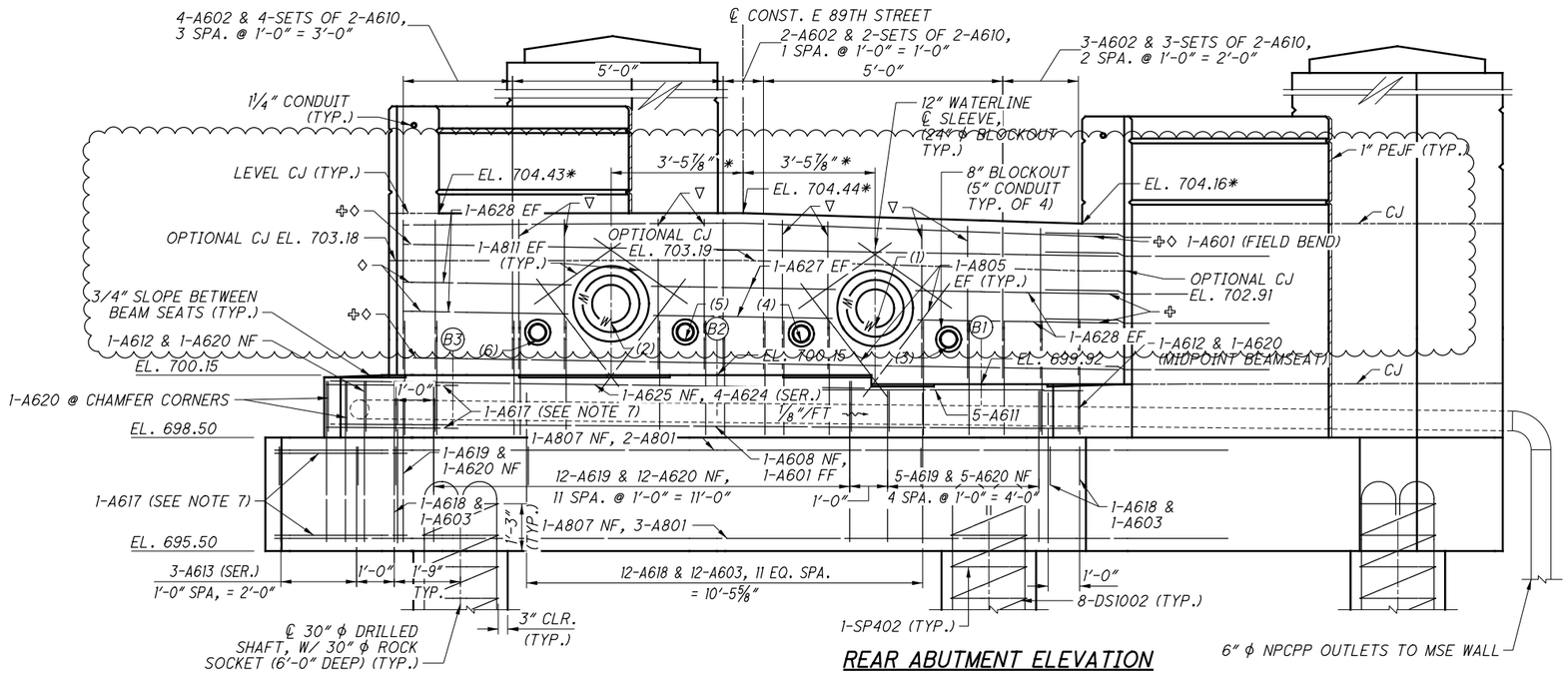
(#) - UTILITY DESIGNATION

(BX) - BEAM DESIGNATION

▽ - 1-A622 & 1-SET OF 2-A610 PLACED PARALLEL TO BLOCKOUT

✣ - 1-A623 TO LAP A607 IN WINGWALLS AND A601 & A614 IN BACKWALLS

◇ - 1-A626 NF TO LAP A607 IN WINGWALLS AND A601 & A614 IN BACKWALLS



REAR ABUTMENT ELEVATION

(MSE WALL NOT SHOWN FOR CLARITY)

NOTES:

1. SEE SECTIONS B, D AND E ON SHEET 13/37 .
2. SEE SHEET 10/37 FOR MSE WALL DETAILS.
3. SEE SHEET 12/37 FOR VIEWS F AND G AND WINGWALL REINFORCING.
4. SEE SHEET 30/37 FOR PYLON REINFORCING AND DETAILS.
5. SEE SHEETS 26/37 AND 27/37 FOR RAILING REINFORCING AND DETAILS.
6. SEE SHEET 35/37 FOR REINFORCING SCHEDULE.
7. A617 TO LAP A609 WINGWALL BARS, A601 BARS AND A614 BAR ALONG CHAMFERED CORNER.

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RECORD PLANS

REAR ABUTMENT PLAN & ELEVATION
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

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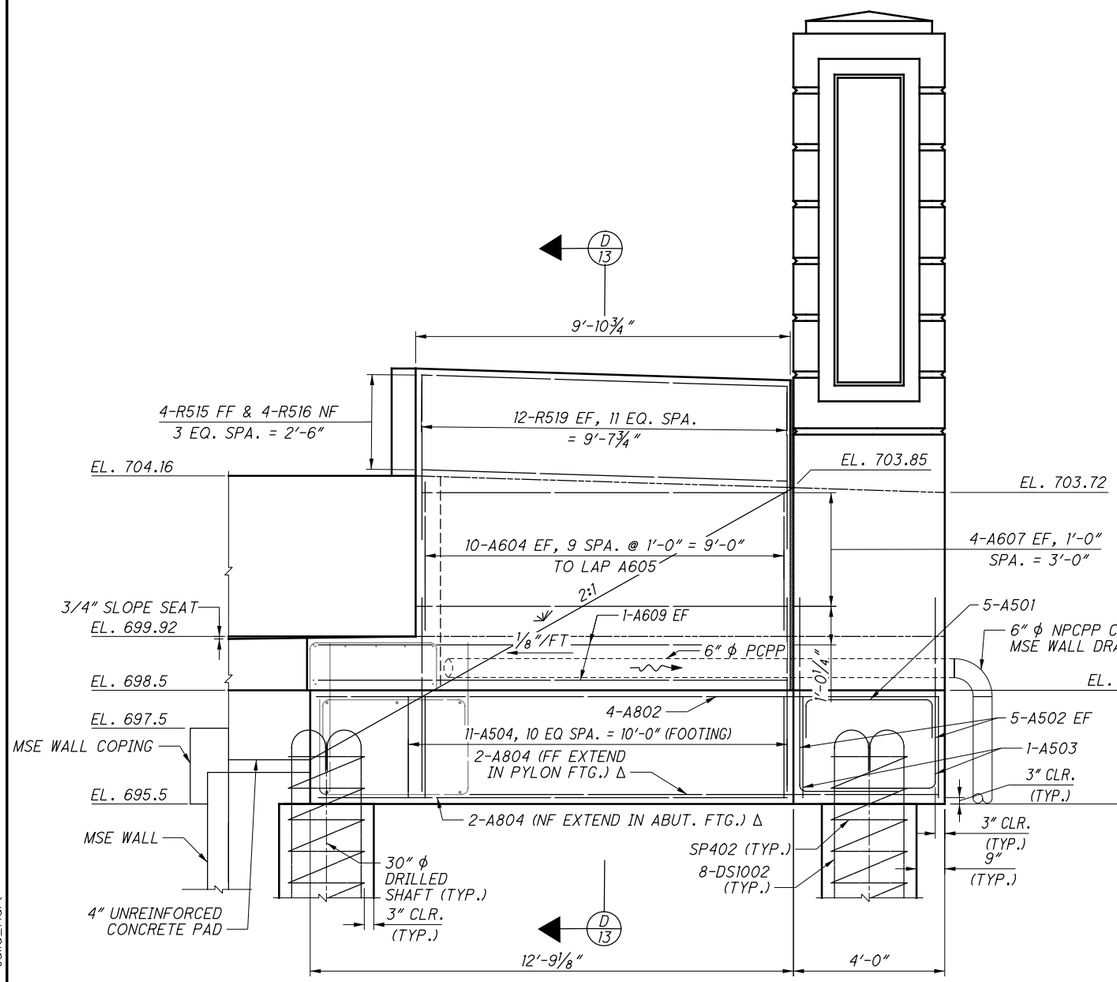
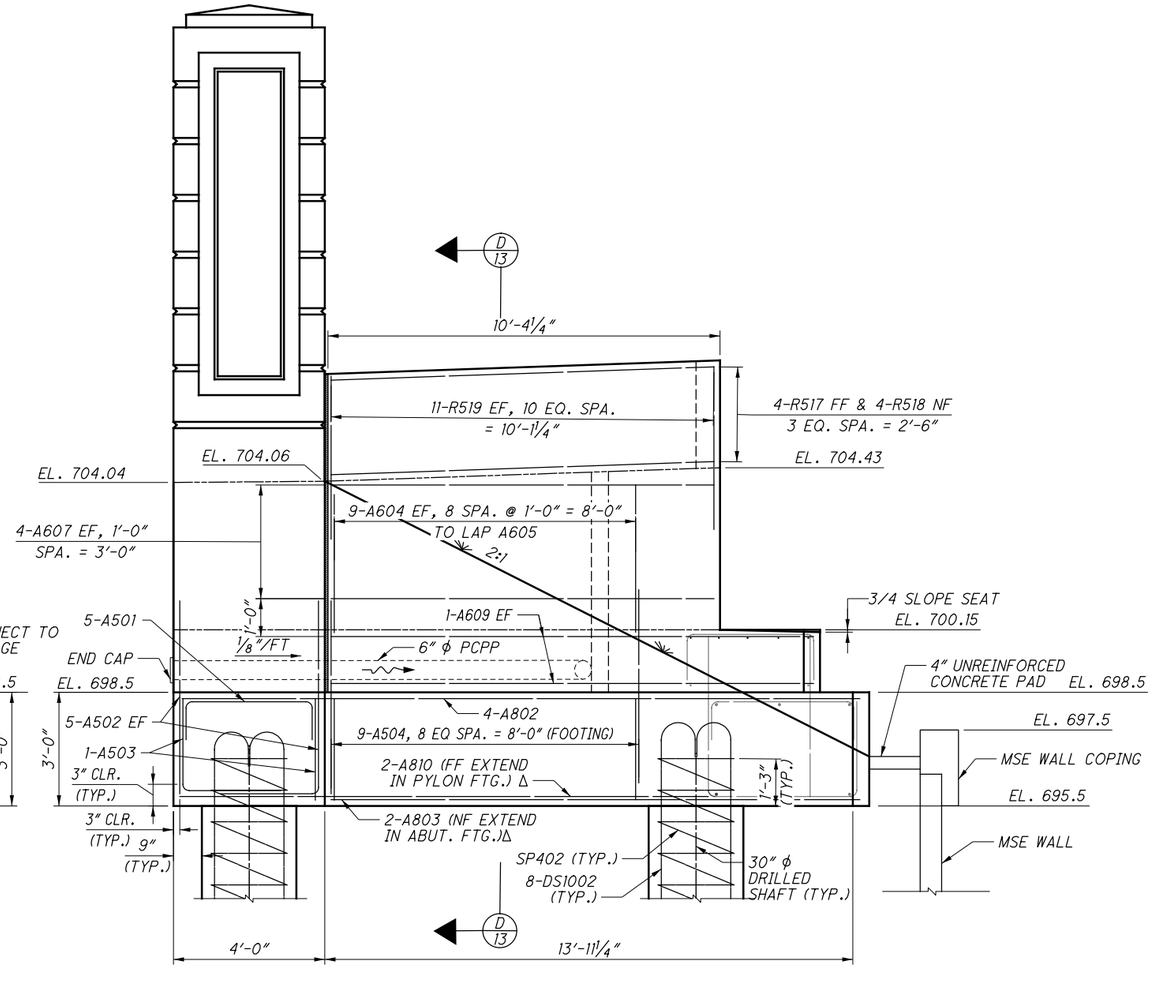


LEFT WINGWALL ELEVATION

G/11 VIEW



RIGHT WINGWALL ELEVATION

F/11 VIEW

LEGEND:

Δ PLACED TO AVOID DRILLED SHAFTS

NOTES:

1. SEE SHEET 11/37 FOR ABUTMENT PLAN & ELEVATION.
2. SEE SHEET 12/37 FOR LOCATION OF VIEWS F & G.
3. SEE SHEET 30/37 FOR PYLON REINFORCEMENT.
4. SEE SHEETS 26/37 AND 27/37 FOR RAILING REINFORCEMENT.
5. SEE SHEET 35/37 FOR REINFORCING SCHEDULE.

MIN. LAP LENGTH	
# 6	3'-10"

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RECORD PLANS

REAR ABUTMENT WINGWALLS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
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BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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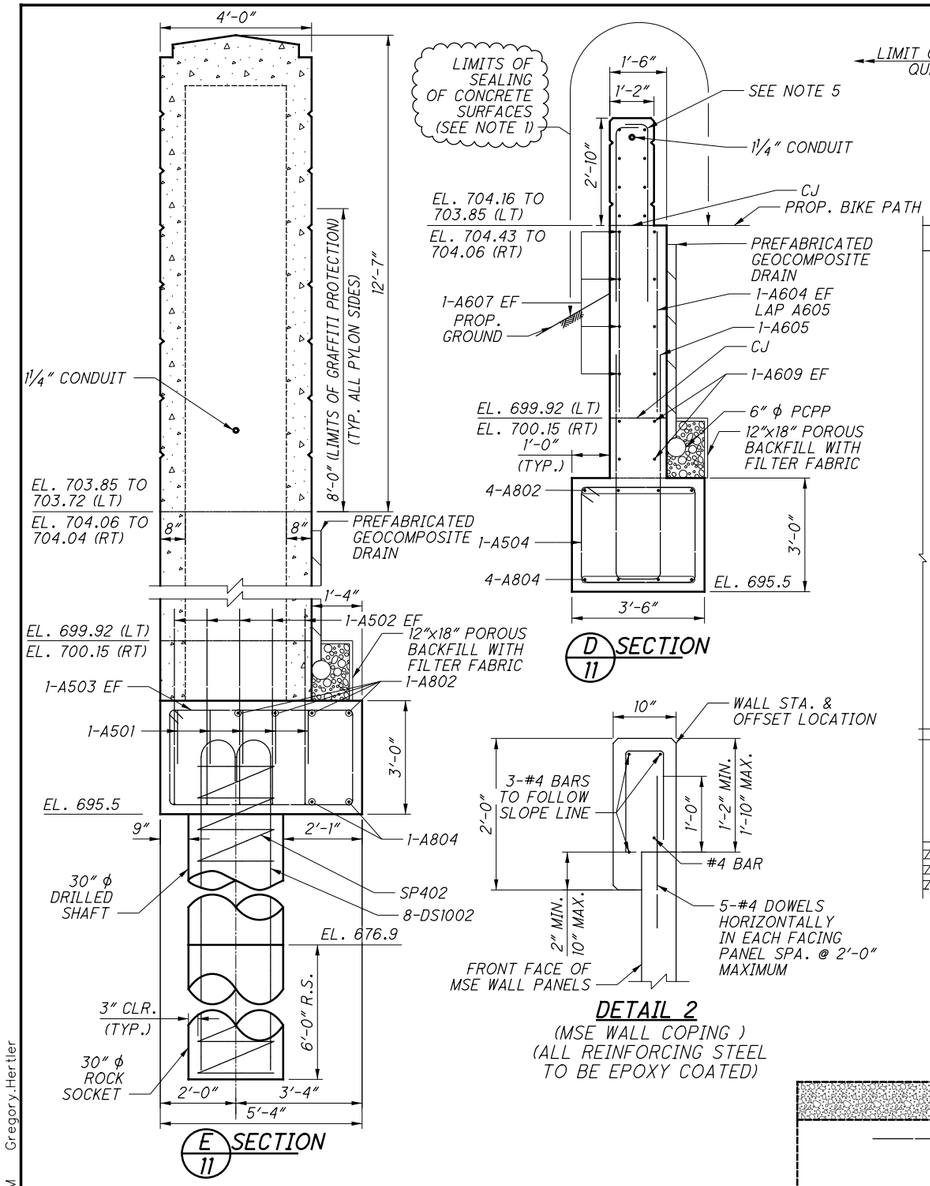


MIN. LAP LENGTH	
# 6	3'-10"

NOTES:

1. SEAL EXPOSED CONCRETE SURFACES. ANTI- GRAFFITI COATING SHALL BE APPLIED ON ALL SURFACES AT A MINIMUM OF EIGHT (8) FEET ABOVE GROUND.
2. LEVEL PAD TO BE PLACED ON ROCK. IF ROCK IS DEEPER THAN ANTICIPATED, EXCAVATE TO ROCK AND REPLACE WITH ITEM 203, GRANULAR MATERIAL TYPE C.
3. REFER TO SHEET 10/37 FOR OUTLET LOCATIONS.
4. REFER TO SHEET32/37 FOR EXPANSION JOINT DETAILS.
5. SEE SHEETS 26/37 AND 27/37 FOR RAILING REINFORCEMENT AND SHEET 30/37 FOR PYLON REINFORCEMENT. SEE SHEET 35/37 FOR REINFORCING SCHEDULE.
6. REFER TO SHEET 34/37 FOR UTILITY CASING PIPE THROUGH THE BACKWALL.

NO.	DATE	DESCRIPTION
		ISSUE RECORD
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED LAW | DRAWN JBM | REVIEWED MUR | DATE 09/23/19
CHECKED JAH | REVISED | STRUCTURE FILE NUMBER TBD

RECORD PLANS

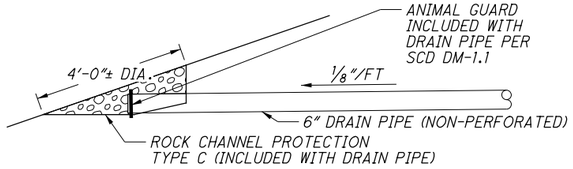
REAR ABUTMENT SECTIONS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

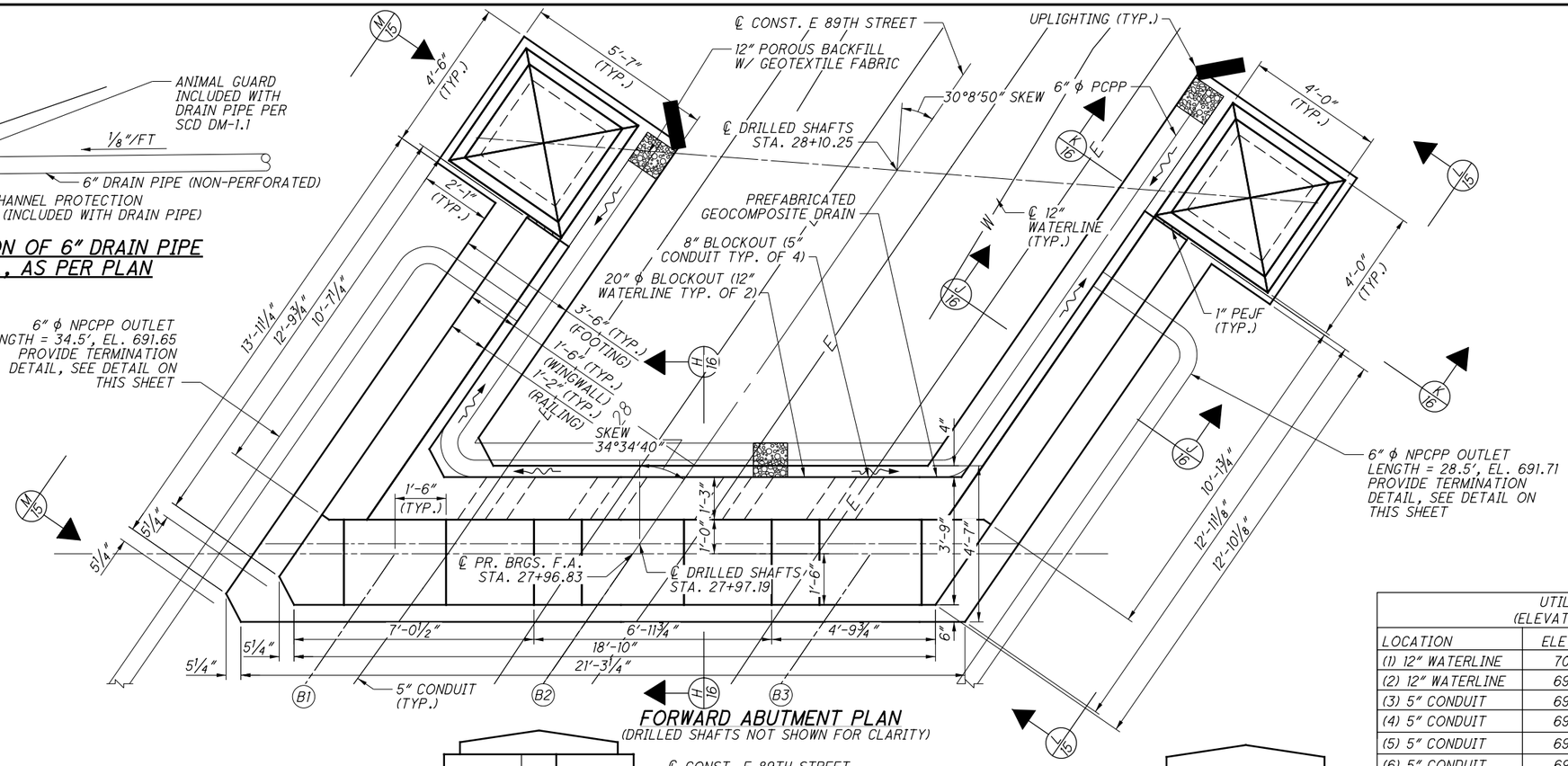
CUY-IR490/SR010-2.09/19.28
PID No. 96833

13/37
15/39

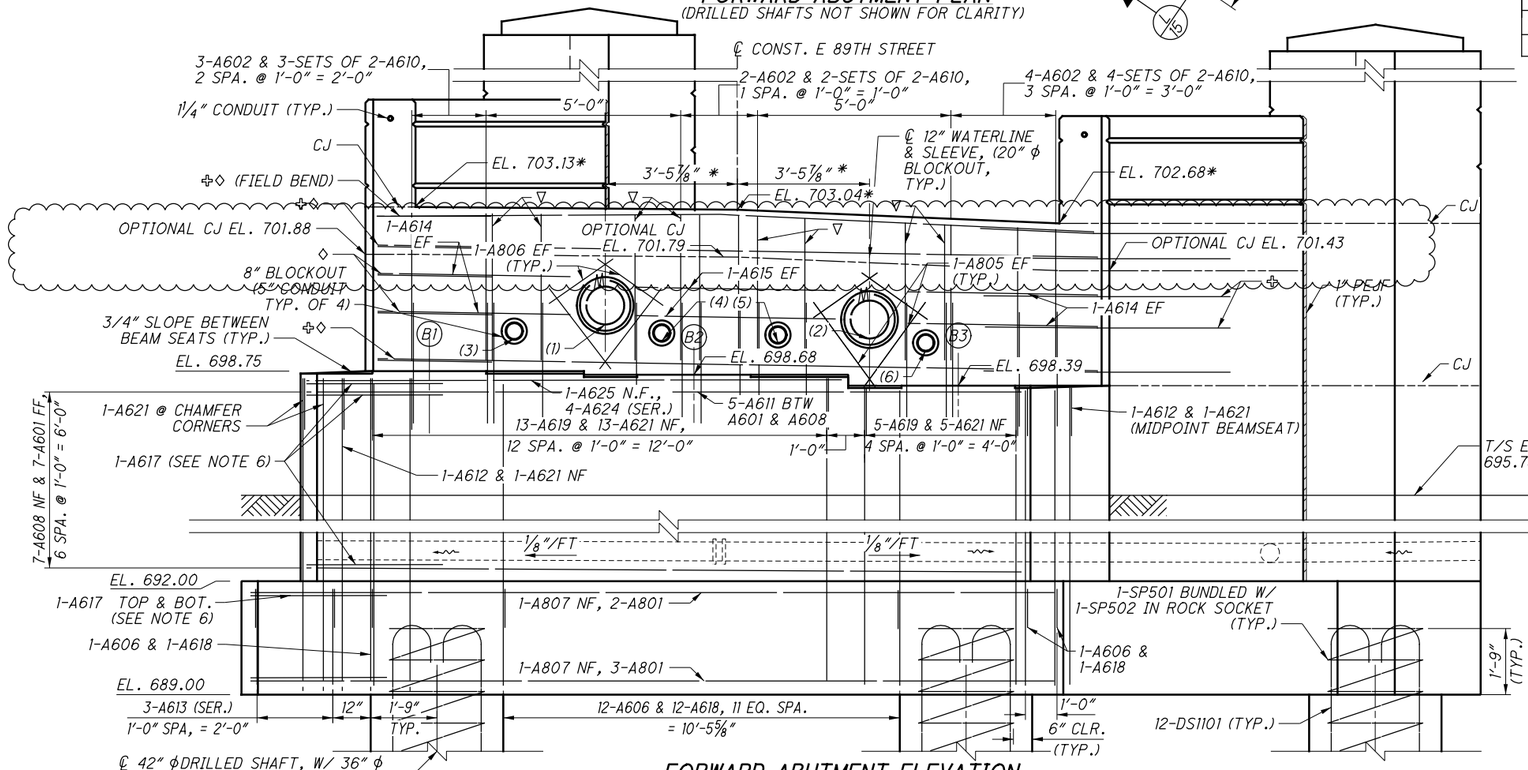
BU-25 - E 89TH ST PEDESTRIAN BRIDGE
...\Sheets\4015_SR703.dgn 12/17/2024 12:29:38 PM Gregory.Hertler



TERMINATION OF 6" DRAIN PIPE DETAIL, AS PER PLAN



FORWARD ABUTMENT PLAN
(DRILLED SHAFTS NOT SHOWN FOR CLARITY)



FORWARD ABUTMENT ELEVATION

MIN. LAP LENGTH	
# 6	3'-10"

UTILITY ℄ INFORMATION (ELEVATIONS PROVIDED AT INVERT)			
LOCATION	ELEVATION	STATION	OFFSET
(1) 12" WATERLINE	700.01	27+96.07	2.88' LT
(2) 12" WATERLINE	699.83	28+00.04	2.88' RT
(3) 5" CONDUIT	699.75	27+94.97	4.47' LT
(4) 5" CONDUIT	699.70	27+97.18	1.27' LT
(5) 5" CONDUIT	699.62	27+98.92	4.47' RT
(6) 5" CONDUIT	699.47	28+01.14	1.27' RT

LEGEND:

* - ELEVATIONS PROVIDED ALONG BACKWALL

(#) - UTILITY DESIGNATION

(BX) - BEAM DESIGNATION

▽ - 1-A622 & 1-SET OF 2-A610 PLACED PARALLEL TO BLOCKOUT

✣ - 1-A623 TO LAP A607 IN WINGWALLS AND A601 & A614 IN BACKWALLS

◇ - 1-A626 NF TO LAP A607 IN WINGWALLS AND A601 & A614 IN BACKWALLS

NOTES:

1. SEE SECTIONS H, J AND K ON SHEET 16/37 .
2. SEE VIEWS L & M ON SHEET 15/37 FOR WINGWALL REINFORCING.
3. SEE SHEET 15/37 FOR PYLON REINFORCING AND DETAILS.
4. SEE SHEETS 26/37 AND 27/37 FOR RAILING REINFORCING AND DETAILS.
5. SEE SHEET 35/37 FOR REINFORCING SCHEDULE.
6. A617 TO LAP A609 WINGWALL BARS, A601 BARS AND A614 BAR ALONG CHAMFERED CORNER.

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
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JAH		TBD	

RECORD PLANS

FORWARD ABUTMENT PLAN & ELEVATION
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

14 / 37

16 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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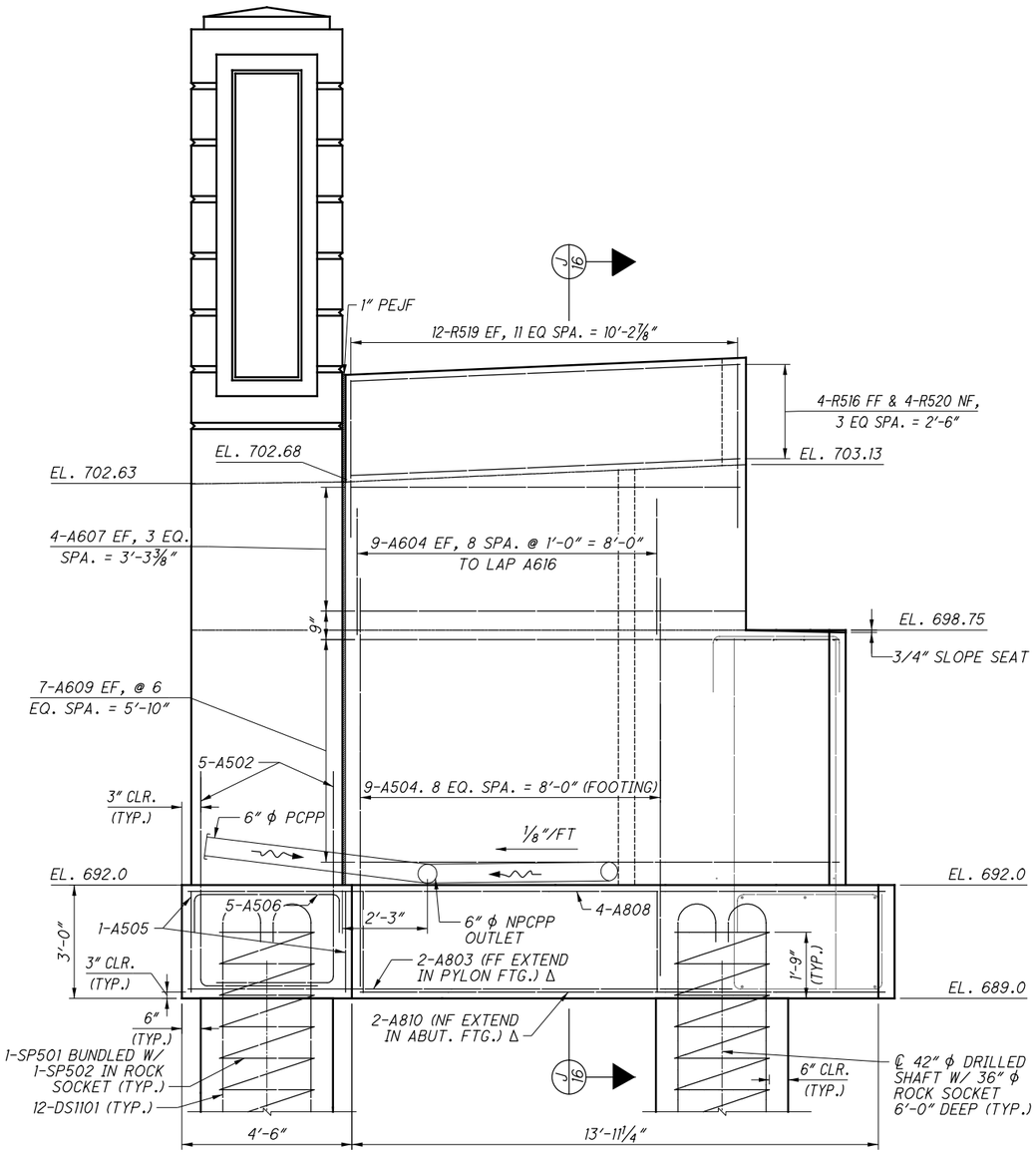
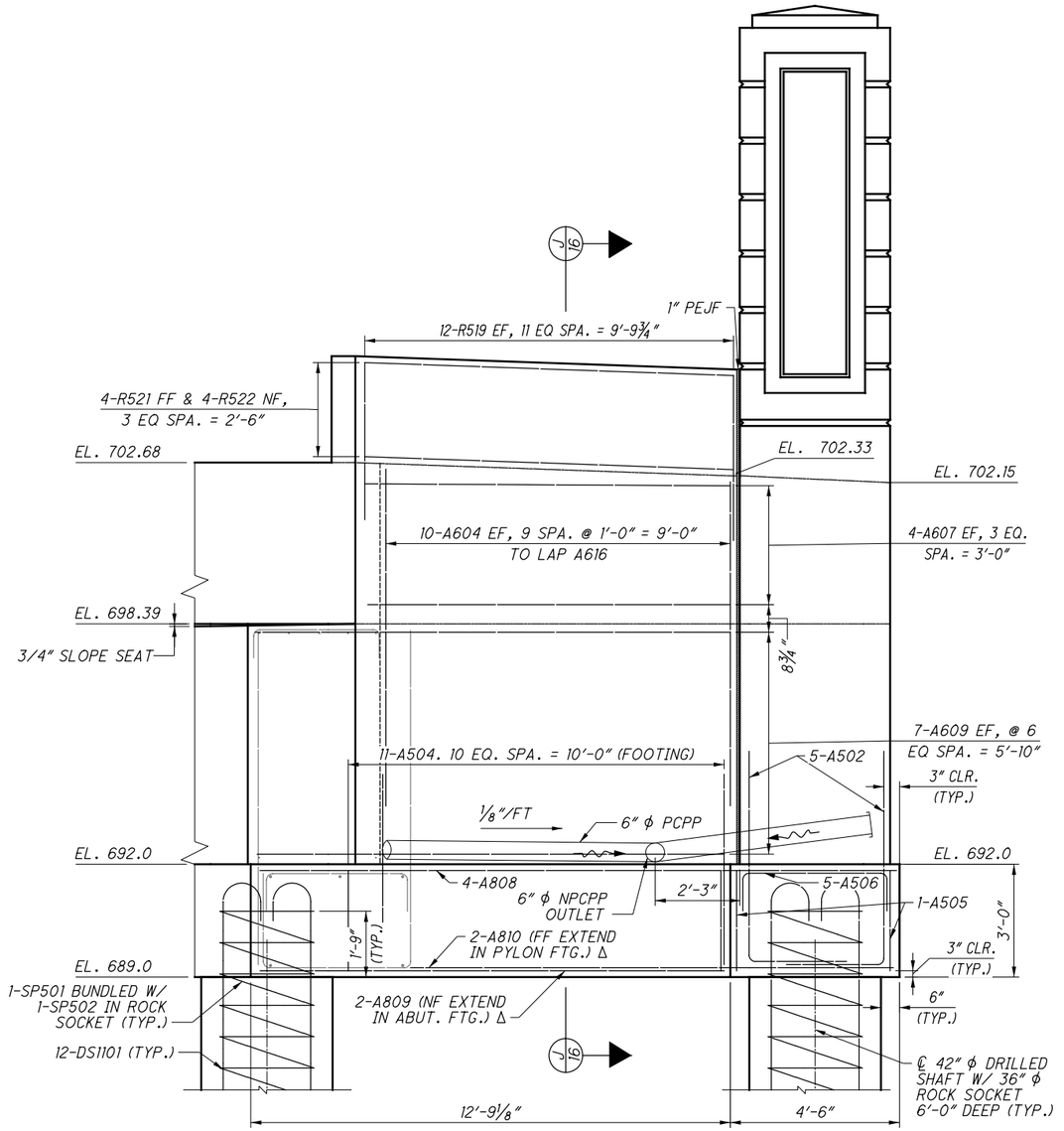


LEFT WINGWALL ELEVATION

M/11 SECTION



RIGHT WINGWALL ELEVATION

L/11 SECTION

MIN. LAP LENGTH	
# 6	3'-10"

NOTES:

1. SEE SHEET 14/37 FOR ABUTMENT PLAN & ELEVATION.
2. SEE SHEET 14/37 FOR LOCATION OF VIEWS L & M AND SECTION B.
3. SEE SHEETS 29/37 FOR PYLON REINFORCEMENT.
4. SEE SHEETS 26/37 AND 27/37 FOR RAILING REINFORCEMENT.
5. SEE SHEET 35/37 FOR REINFORCING SCHEDULE.

LEGEND:

Δ PLACED TO AVOID DRILLED SHAFTS

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

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2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
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RECORD PLANS

FORWARD ABUTMENT WINGWALLS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

15/37

17/39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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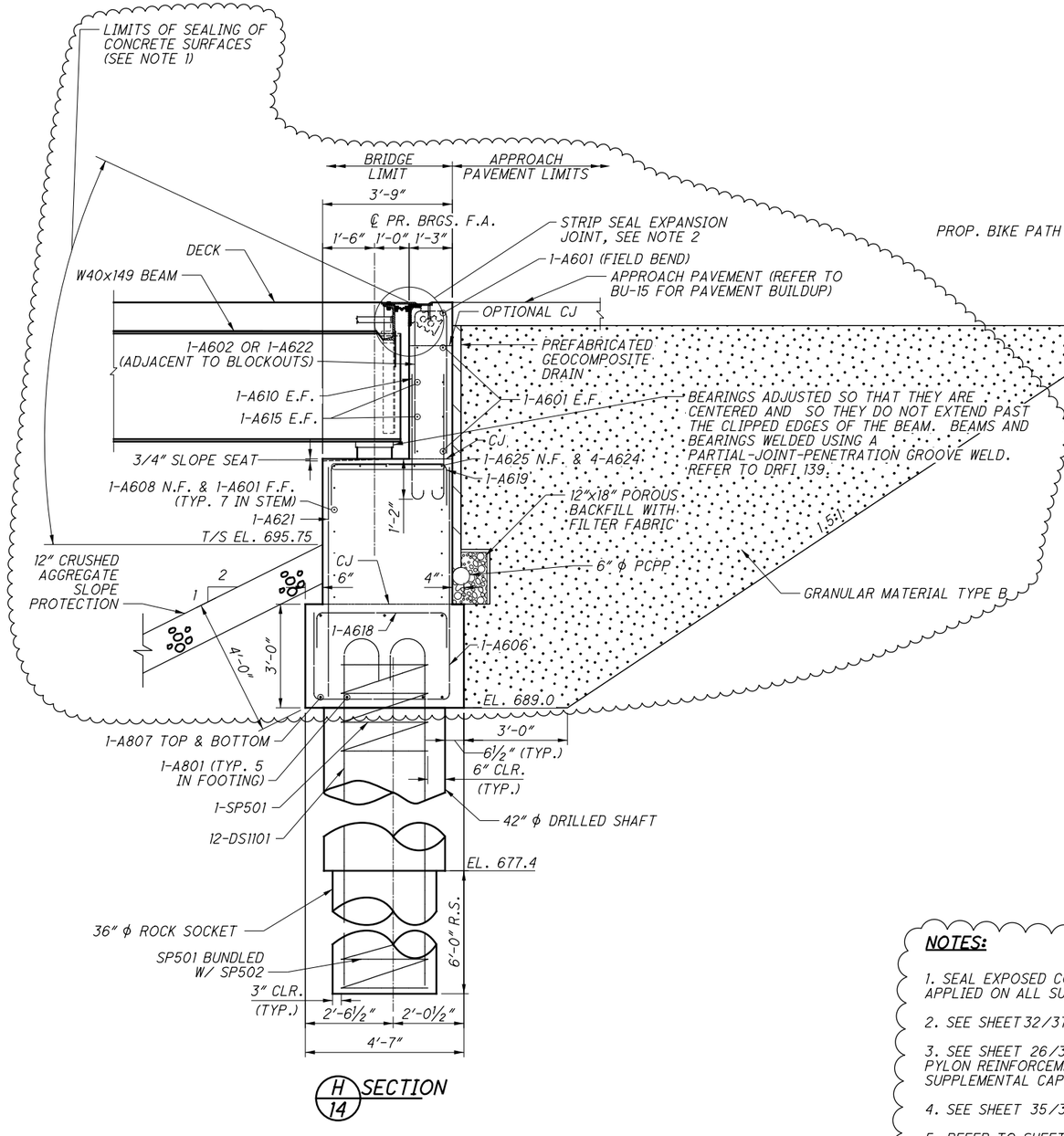
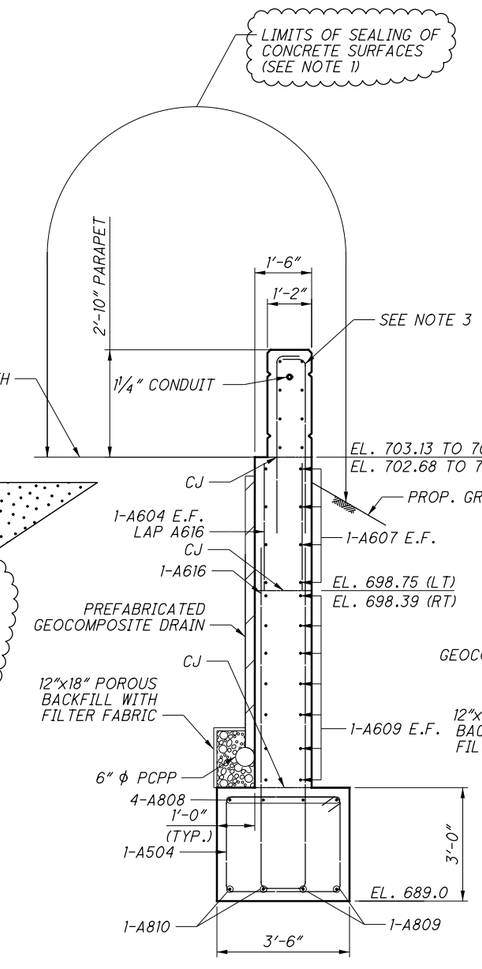
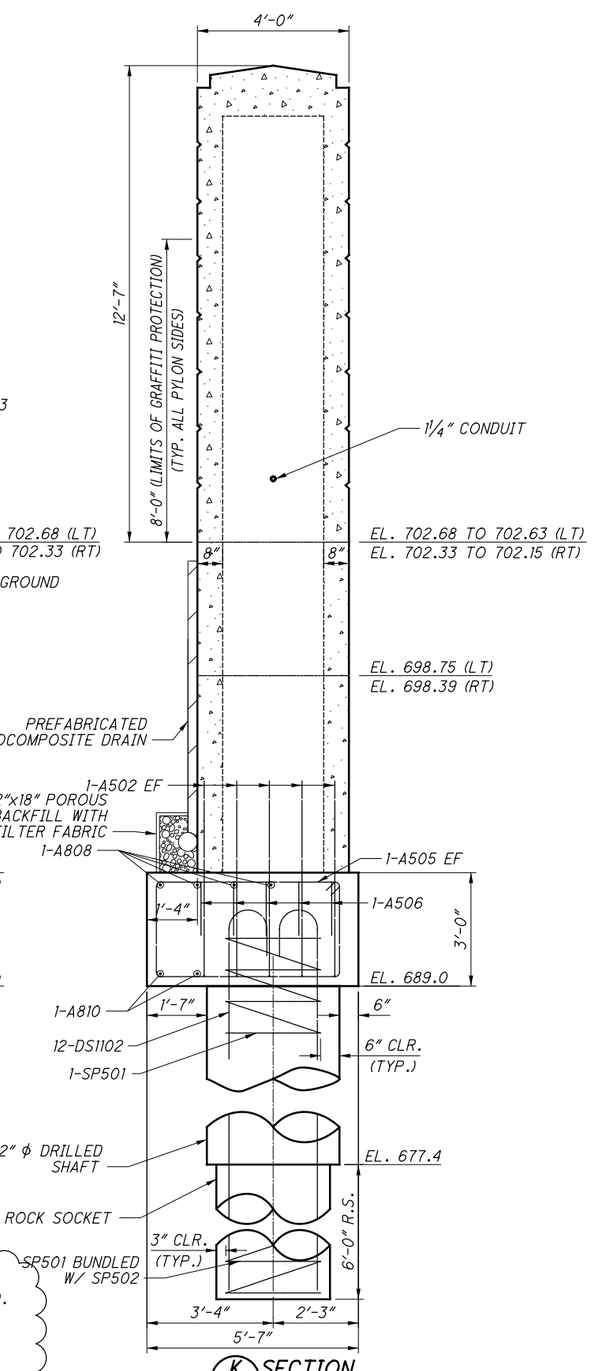


H/14 SECTION



J/14 SECTION



K/14 SECTION

MIN. LAP LENGTH	
# 6	3'-10"

NOTES:

1. SEAL EXPOSED CONCRETE SURFACES. ANTI-GRAFFITI COATING SHALL BE APPLIED ON ALL SURFACES AT A MINIMUM OF EIGHT (8) FEET ABOVE GROUND.
2. SEE SHEET 32/37 FOR EXPANSION JOINT DETAILS.
3. SEE SHEET 26/37 FOR RAILING REINFORCEMENT AND SHEET 27/37 FOR PYLON REINFORCEMENT. VERTICAL RAILING BARS PLACED TOO LOW. SUPPLEMENTAL CAP REINFORCING ADDED.
4. SEE SHEET 35/37 FOR REINFORCING SCHEDULE.
5. REFER TO SHEET 34/37 FOR UTILITY CASING PIPE THROUGH THE BACKWALL.
6. THE BACKWALLS WERE REMOVED AND REPLACED. ALSO, THE WATER CASINGS AND 5" CONDUIT BLOCK-OUTS WERE MOVED TO THEIR CORRECT LOCATIONS AND ANY NECESSARY DOWEL WORK WAS PERFORMED BEFORE POURING BACK.

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RECORD PLANS

FORWARD ABUTMENT SECTIONS

CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

16 / 37

18 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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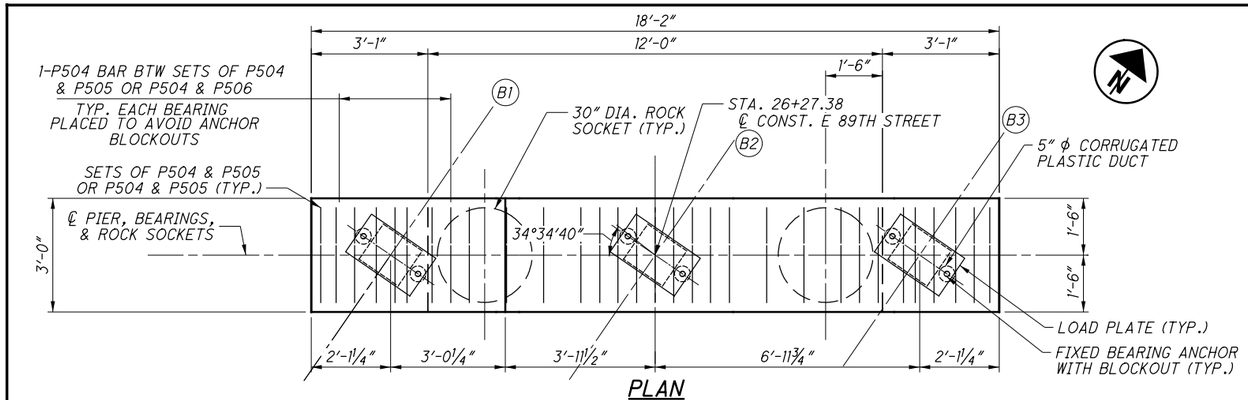
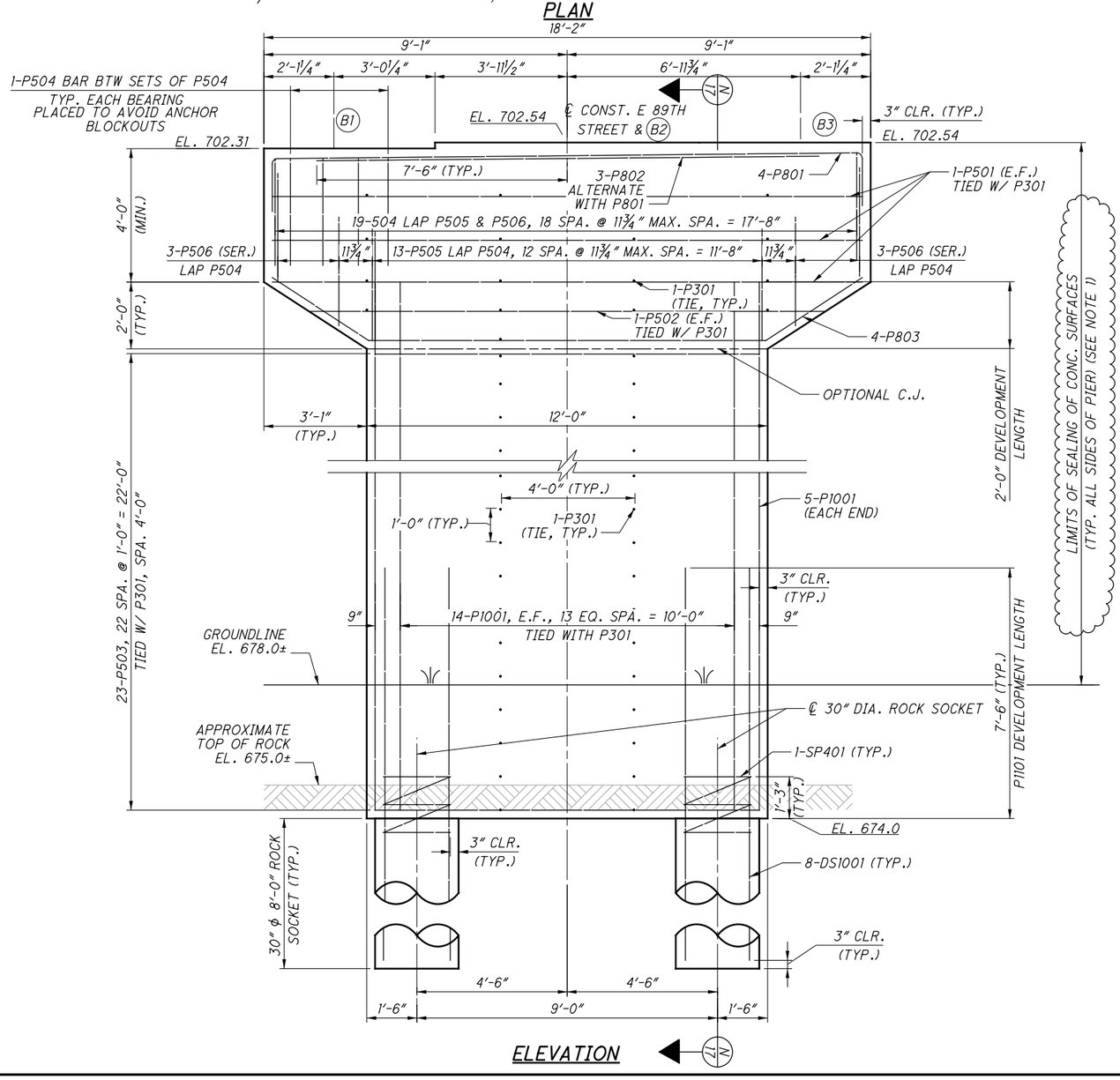
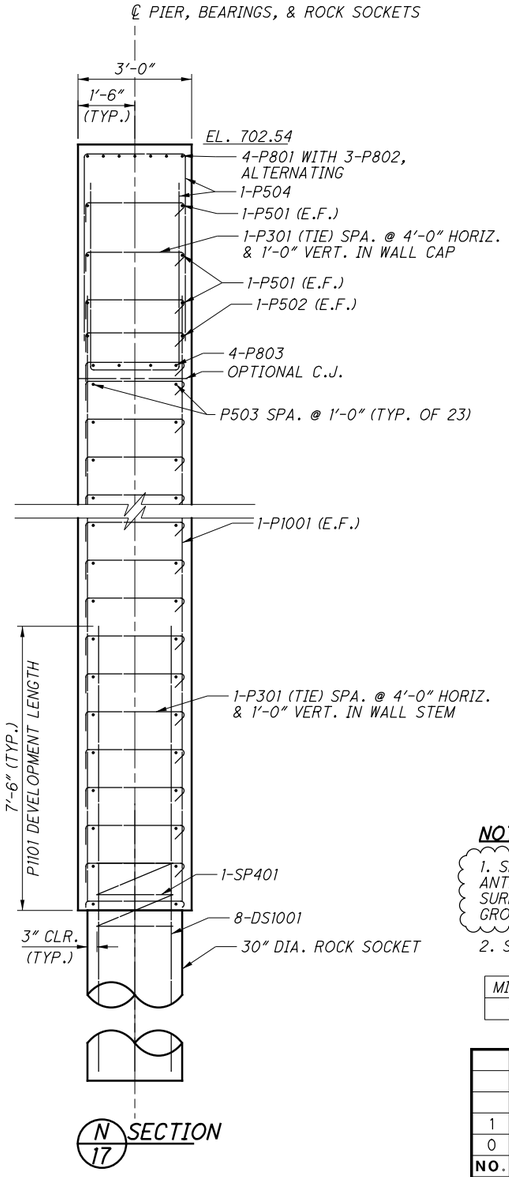


PLAN



ELEVATION



SECTION

NOTES:

1. SEAL EXPOSED CONCRETE SURFACES. ANTI-GRAFFITI COATING SHALL BE APPLIED ON ALL SURFACES AT A MINIMUM OF EIGHT (8) FEET ABOVE GROUND.
2. SEE SHEET 36/37 FOR REINFORCING SCHEDULE.

MIN. LAP LENGTH	
# 5	2'-5"

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

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LAW	MAK	MUR	09/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

PIER 1 DETAILS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

17 / 37

19 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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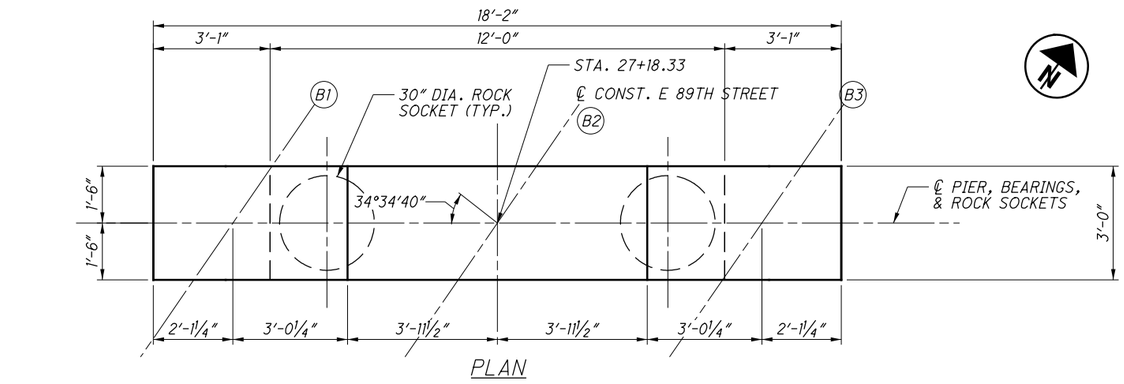
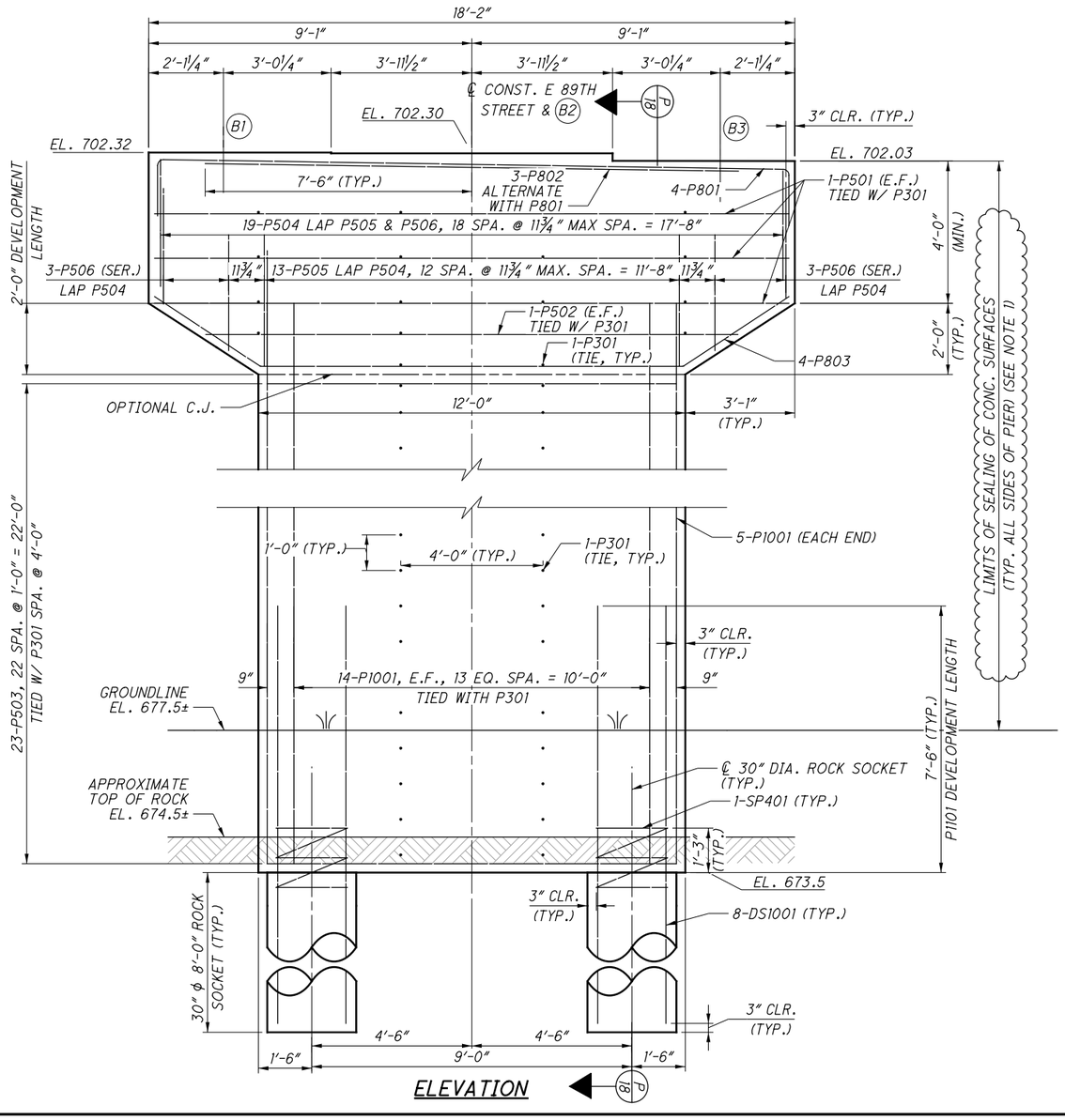
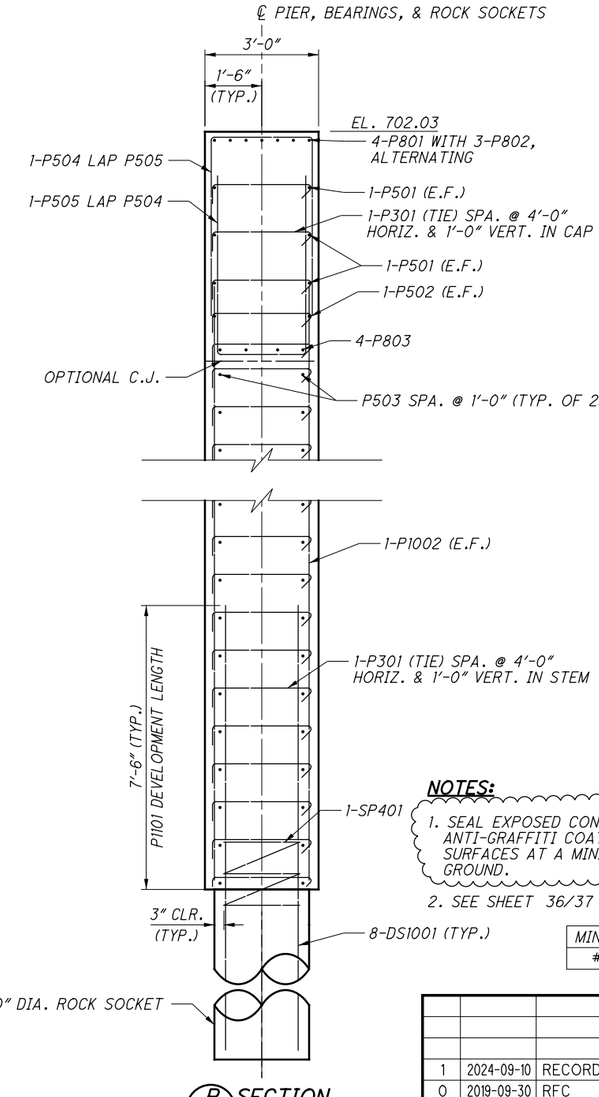


PLAN



ELEVATION



P 18 SECTION

NOTES:

1. SEAL EXPOSED CONCRETE SURFACES. ANTI-GRAFFITI COATING SHALL BE APPLIED ON ALL SURFACES AT A MINIMUM OF EIGHT (8) FEET ABOVE GROUND.
2. SEE SHEET 36/37 FOR REINFORCING SCHEDULE.

MIN. LAP LENGTH	
# 5	2'-5"

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

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LAW	MAK	MJR	09/23/19
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RECORD PLANS

PIER 2 DETAILS

CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

RECORD PLANS

18 / 37

20 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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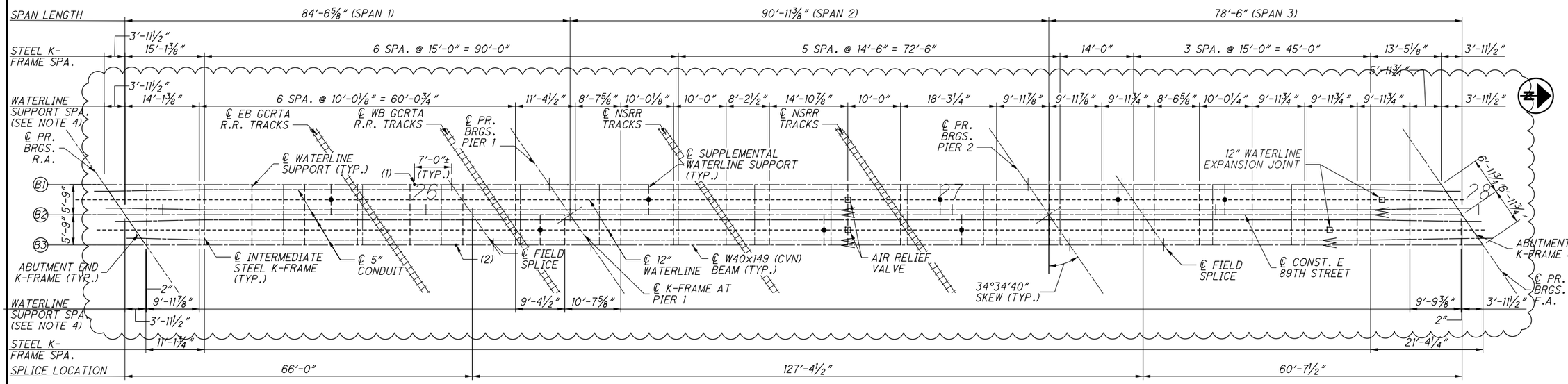
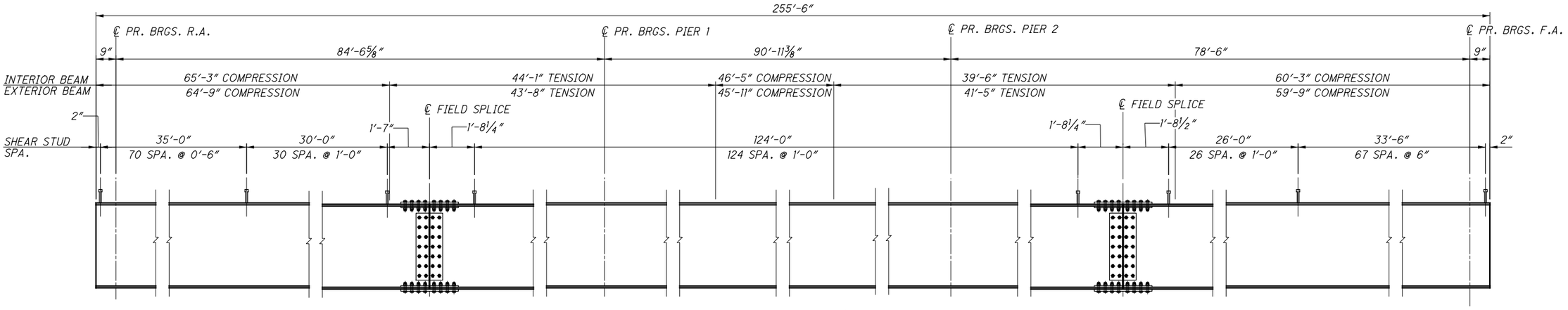
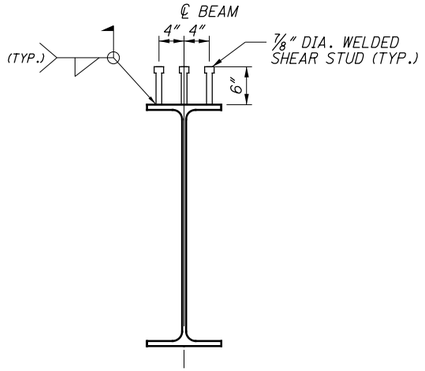


FRAMING PLAN



W40x149 BEAM ELEVATION



SHEAR STUD DETAIL

LEGEND:

(1) SIGNAL SUPPORT STA. 25+97.80, 5.75' LT.

(2) SIGNAL SUPPORT STA. 26+05.72, 5.75' RT.

(BX) BEAM DESIGNATION.

NOTES:

1. ALL STEEL IS ASTM 709, GRADE 50W, UNLESS NOTED OTHERWISE.
2. SEE SHEET 20/37 FOR SPLICE DETAILS.
3. W40x149 ROLLED BEAMS SHALL BE DESIGNATED "CVN". WHERE A MEMBER IS DESIGNATED (CVN), FURNISH MATERIAL THAT MEETS THE MINIMUM NOTCH TOUGHNESS REQUIREMENTS AS SPECIFIED IN 711.01.
4. SEE SHEET 33/37 FOR SIGNAL WIRE DETAIL.
5. WELD ATTACHMENT OF SUPPORTS FOR CONCRETE DECK FINISHING MACHINE TO AREAS OF THE FASCIA STRINGER FLANGES DESIGNATED "COMPRESSION". DO NOT WELD ATTACHMENTS TO AREAS DESIGNATED "TENSION". FILLET WELDS TO COMPRESSION FLANGES SHALL BE AT LEAST 1" FROM EDGE OF FLANGE, BE NO MORE THAN 2" LONG, AND BE AT LEAST ¼" FOR THICKNESSES UP TO ¾" OR 5/16" FOR GREATER THAN ¾" THICK.

NO.	DATE	DESCRIPTION
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RECORD PLANS

BEAM DETAILS & FRAMING PLAN
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

19 / 37

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BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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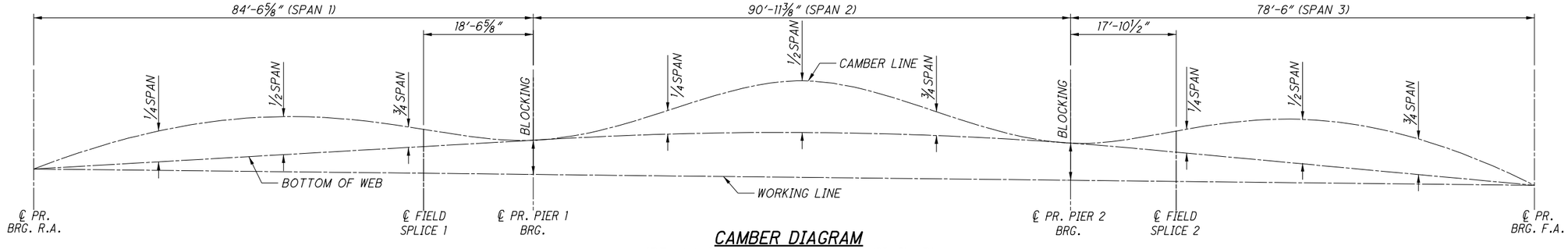
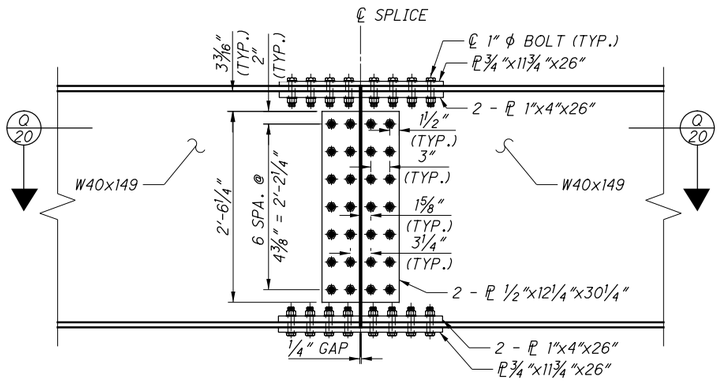


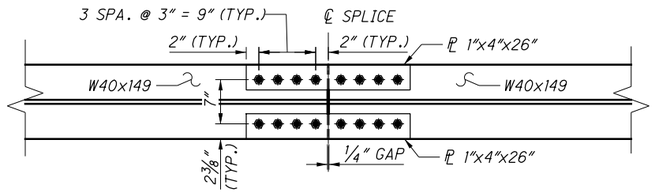
CAMBER DIAGRAM

(BEAM 1 SHOWN; OTHER BEAMS SIMILAR)

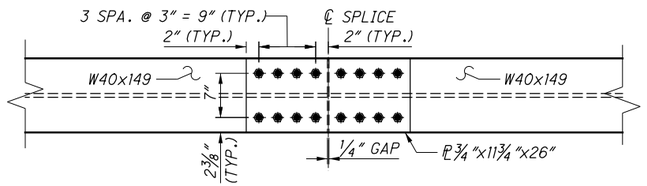
	℄ PR. BRG. R.A.	SPAN 1			℄ FIELD SPLICE 1	℄ PR. PIER 1 BRG.				℄ PR. PIER 2 BRG.	SPAN 3				℄ PR. BRG. F.A.
		1/4 SPAN	1/2 SPAN	3/4 SPAN			1/4 SPAN	1/2 SPAN	3/4 SPAN		℄ FIELD SPLICE 2	1/4 SPAN	1/2 SPAN	3/4 SPAN	
EXTERIOR BEAM 1 - DEFLECTION & CAMBER															
DEFLECTION DUE TO WEIGHT OF STEEL	0"	1/4"	5/16"	1/8"	1/8"	0"	1/16"	1/8"	1/16"	0"	1/16"	1/8"	3/16"	3/16"	0"
DEFLECTION DUE TO REMAINING DEAD LOAD	0"	1 7/16"	1 3/4"	15/16"	13/16"	0"	5/16"	11/16"	3/8"	0"	9/16"	5/8"	1 1/4"	1"	0"
ADJUSTMENT REQUIRED FOR VERTICAL CURVE	0"	0"	0"	0"	0"	0"	6 13/16"	9 3/16"	6 15/16"	0"	15/16"	15/16"	5/8"	5/16"	0"
TOTAL REQUIRED SHOP CAMBER	0"	1 5/8"	2 1/16"	1 1/16"	15/16"	0"	7 1/8"	10"	7 5/16"	0"	1 5/8"	1 11/16"	2 1/16"	1 1/2"	0"
INTERIOR BEAM 2 - DEFLECTION & CAMBER															
DEFLECTION DUE TO WEIGHT OF STEEL	0"	1/4"	5/16"	1/8"	1/8"	0"	1/16"	1/8"	1/16"	0"	1/16"	1/8"	3/16"	3/16"	0"
DEFLECTION DUE TO REMAINING DEAD LOAD	0"	1 7/16"	1 13/16"	15/16"	13/16"	0"	5/16"	11/16"	3/8"	0"	9/16"	11/16"	1 5/16"	1 1/16"	0"
ADJUSTMENT REQUIRED FOR VERTICAL CURVE	0"	0"	0"	0"	0"	0"	6 15/16"	9 1/4"	6 15/16"	0"	9/16"	9/16"	3/8"	3/16"	0"
TOTAL REQUIRED SHOP CAMBER	0"	1 11/16"	2 1/8"	1 1/8"	15/16"	0"	7 5/16"	10 1/16"	7 3/8"	0"	1 1/4"	1 5/16"	1 7/8"	1 3/8"	0"
EXTERIOR BEAM 3 - DEFLECTION & CAMBER															
DEFLECTION DUE TO WEIGHT OF STEEL	0"	1/4"	5/16"	1/8"	1/8"	0"	1/16"	1/8"	1/16"	0"	1/16"	1/8"	3/16"	3/16"	0"
DEFLECTION DUE TO REMAINING DEAD LOAD	0"	1 7/16"	1 3/4"	15/16"	13/16"	0"	5/16"	11/16"	3/8"	0"	9/16"	5/8"	1 1/4"	1"	0"
ADJUSTMENT REQUIRED FOR VERTICAL CURVE	0"	0"	0"	0"	0"	0"	7"	9 5/16"	7"	0"	1/4"	1/4"	3/16"	1/16"	0"
TOTAL REQUIRED SHOP CAMBER	0"	1 5/8"	2 1/16"	1 1/16"	15/16"	0"	7 5/16"	10 1/8"	7 3/8"	0"	15/16"	1"	1 5/8"	1 1/4"	0"



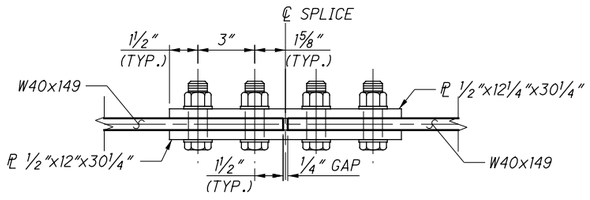
FIELD SPLICE DETAIL (INTERIOR & EXTERIOR BEAMS)



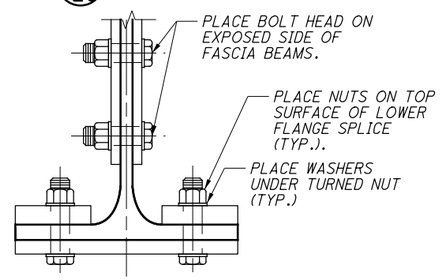
INNER FIELD SPLICE DETAIL (INTERIOR & EXTERIOR BEAMS)



OUTER FIELD SPLICE DETAIL (INTERIOR & EXTERIOR BEAMS)



Q 20 SECTION



BOLTED SPLICE

(PARTIAL SECTION)

REQUIRED BLOCKING				
	℄ PR. BRG. R.A.	℄ PR. PIER 1 BRG.	℄ PR. PIER 2 BRG.	℄ PR. BRG. F.A.
EXTERIOR BEAM 1	0'-0"	2'-9 1/2"	3'-2 5/16"	0'-0"
INTERIOR BEAM 2	0'-0"	2'-10 11/16"	3'-1 11/16"	0'-0"
EXTERIOR BEAM 3	0'-0"	2'-11 7/8"	3'-1"	0'-0"

NOTES:

1. ALL W40X149 BEAMS AND SPLICE PLATES SHALL BE "CVN." FURNISH MATERIAL THAT MEETS THE MINIMUM NOTCH TOUGHNESS REQUIREMENTS AS SPECIFIED IN 711.01. ALL PLATES SHALL BE ASTM A709 GRADE 50W UNLESS OTHERWISE NOTED.
2. HIGH STRENGTH BOLTS SHALL BE 1" DIAMETER A325 TYPE III UNLESS OTHERWISE NOTED.
3. ALL VALUES IN THE DEFLECTION AND CAMBER TABLE ARE GIVEN TO THE NEAREST 1/16".
4. POSITIVE VALUES FOR DEFLECTION INDICATE DOWNWARD DEFLECTIONS.
5. SPAN LENGTHS ARE MEASURED FROM CENTER TO CENTER OF BEARINGS ALONG THE CENTERLINE.
6. SEE SHEET 19/37 FOR FIELD SPLICE LOCATIONS.
7. DEFLECTION DUE TO REMAINING DEAD LOAD ARE DEFELCTIONS DUE TO SLAB AND COMPOSITE DECK LOADS (WATERLINE, PARAPET, AND FENCING LOADS).
8. PREPARE FAYING SURFACES TO PROVIDE CLASS A SURFACES.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
DLZ OHIO, Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED JBM | DRAWN MAK | REVIEWED MUR | DATE 09/23/19
CHECKED JAH | REVISED | STRUCTURE FILE NUMBER TBD

RECORD PLANS

FIELD SPLICE DETAILS, CAMBER & BLOCKING
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

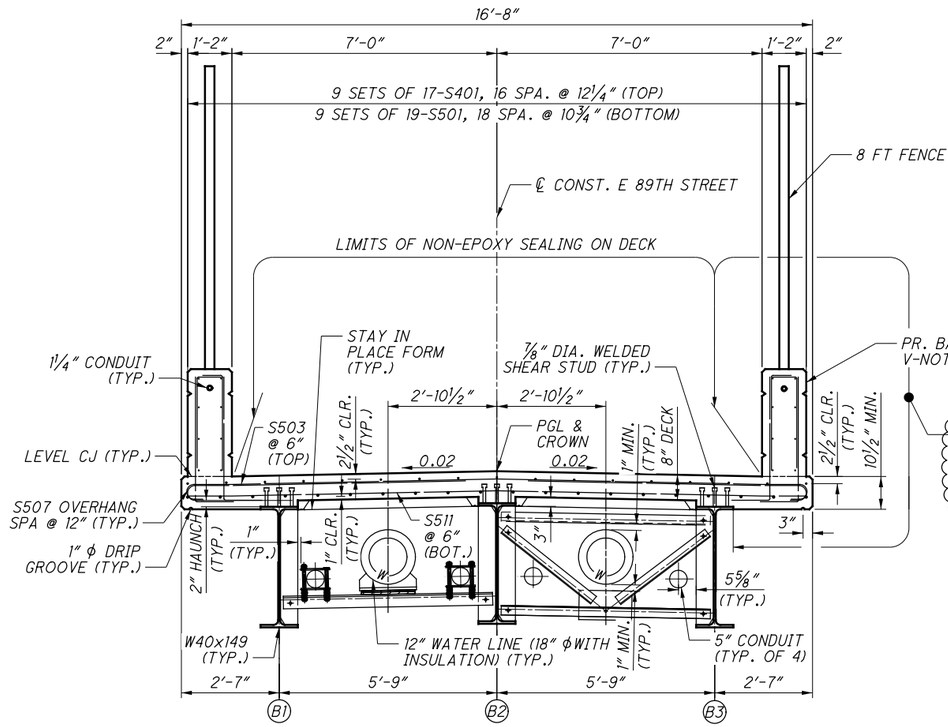
RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

20 / 37

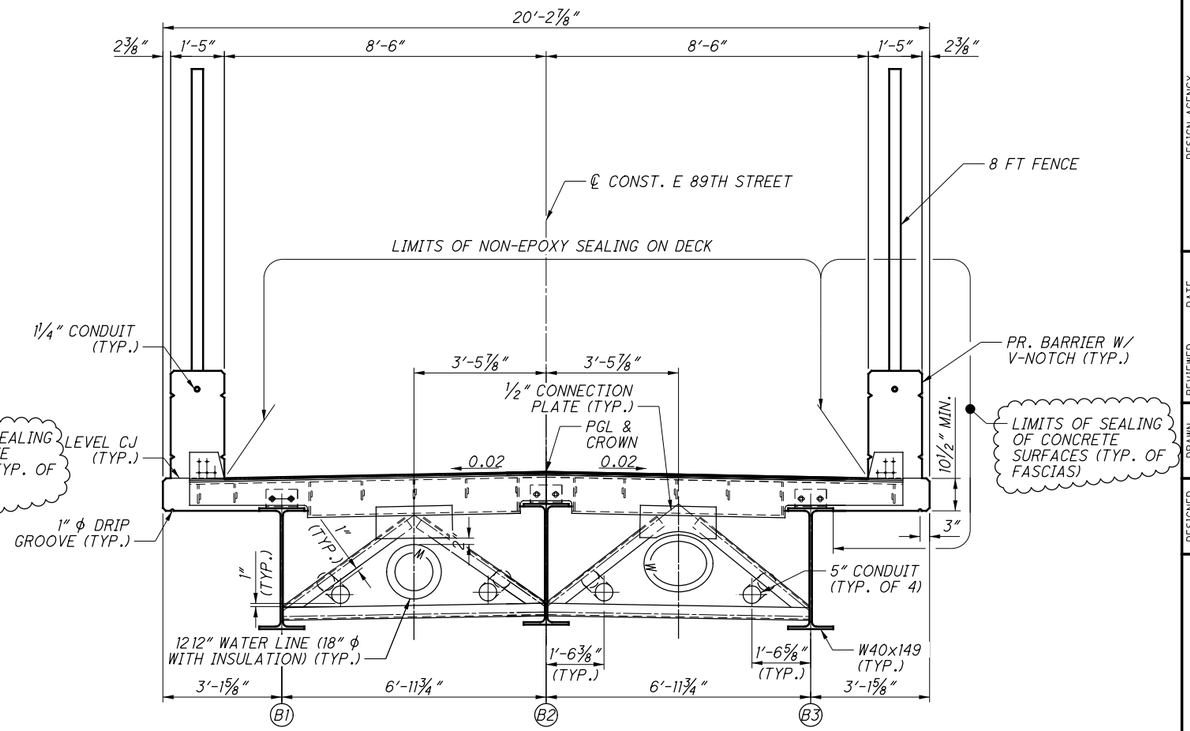
22 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
...\Sheets\4015_SS702.dgn 11/19/2019 6:22:44 AM Julia_Hart



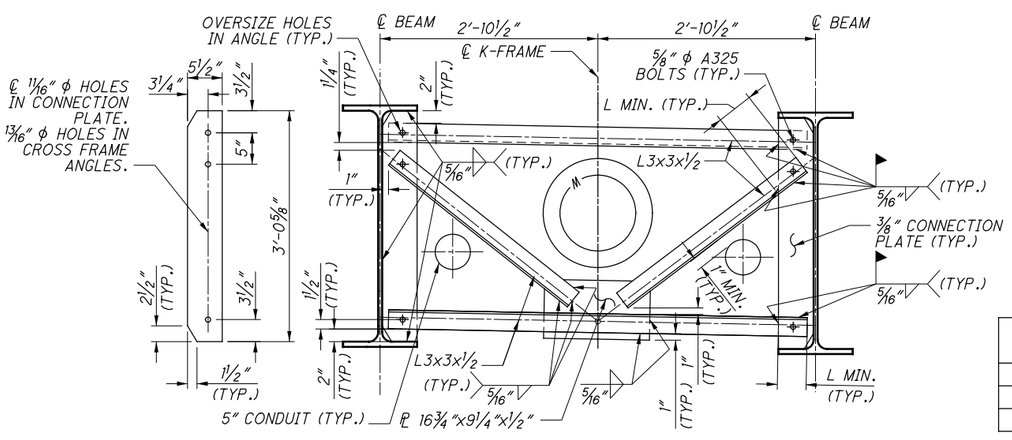
TRANSVERSE SECTION - INTERMEDIATE K-FRAME & WATERLINE SUPPORT

(WATERLINE SUPPORT OR INTERMEDIATE K-FRAME WILL BE IN BOTH BAYS, ONE OF EACH TYPE SHOWN HERE)



TRANSVERSE SECTION - END K-FRAME

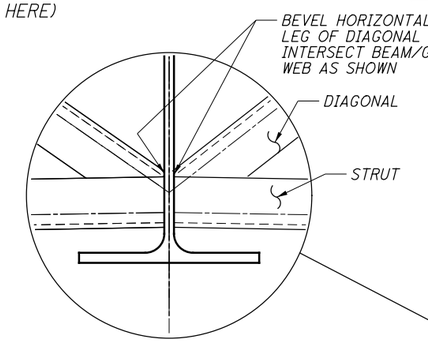
(SHOWN ALONG SKEW)

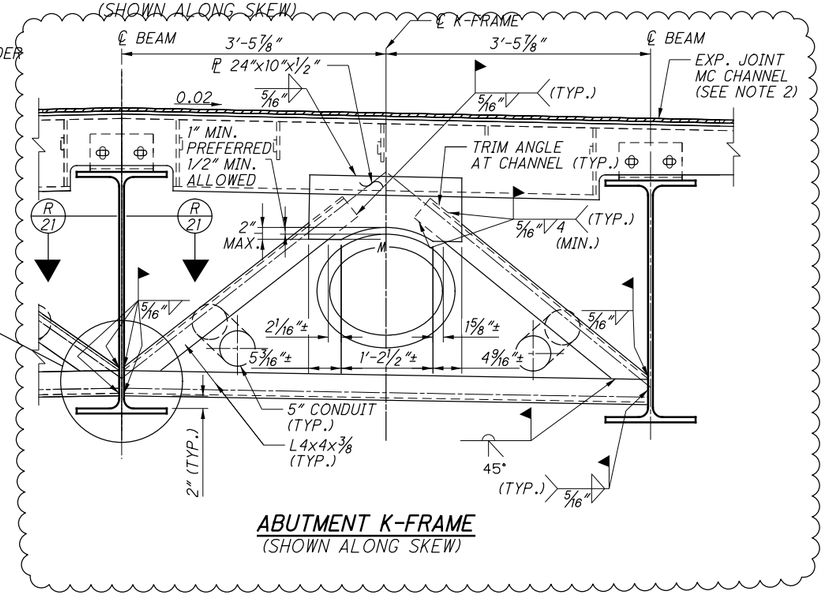


CONNECTION PLATE

INTERMEDIATE K-FRAME

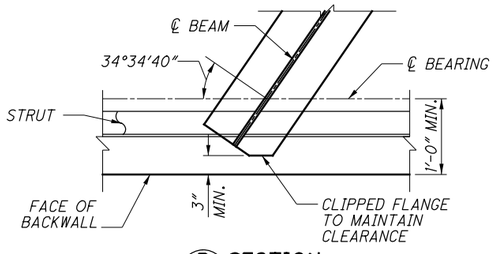
MEMBER	MIN. WELD LENGTH, L MIN
TOP STRUT L3x3x½	4½"
DIAGONAL STRUT L3x3x½	5"
BOTTOM STRUT L3x3x½	4½"





ABUTMENT K-FRAME

(SHOWN ALONG SKEW)



R 21 SECTION

NOTES:

1. GRAFFITI PROTECTION SHALL BE APPLIED TO PARAPETS. SEE SHEETS 25/37 TO 29/37 FOR RAILING & FENCE DETAILS.
2. SEE STANDARD DRAWING EXJ-4-87 AND SHEET 32/37 FOR ADDITIONAL NOTES AND DETAILS.
3. REFER TO SHEET 34/37 FOR WATERLINE SUPPORT DETAILS.
4. ALL STEEL IS ASTM 709, GRADE 50W, UNLESS NOTED OTHERWISE.
5. ERECTION BOLTS SHALL BE ⅝" DIAMETER, ASTM A325, TYPE III, UNLESS NOTED OTHERWISE.
6. PREPARE FAYING SURFACES FOR INTERMEDIATE K-FRAME BOLTED CONNECTIONS TO PROVIDE CLASS B SURFACES.
7. THE FIELD-WELDED INTERMEDIATE K-FRAME INCLUDES AN ERECTION BOLT FOR STEEL BEAM ERECTION AND FIELD WELDED CONNECTION PRIOR TO THE DECK POUR.

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED	DRAWN	REVIEWED	DATE
JBM	MAK	MUR	09/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

TRANSVERSE SECTION

CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

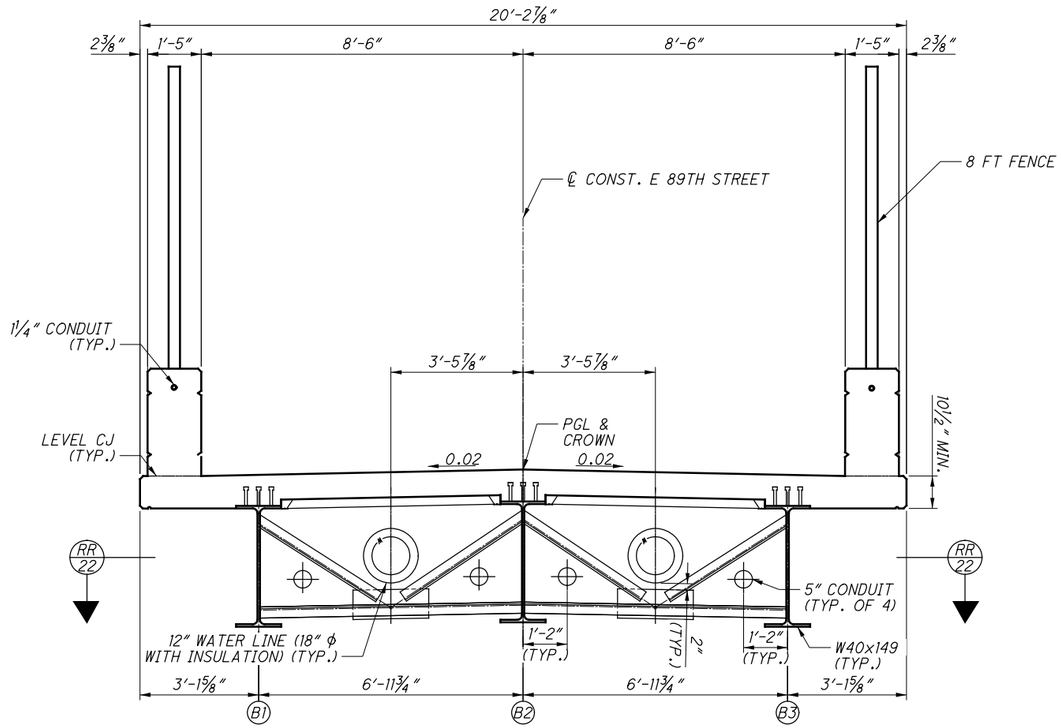
RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

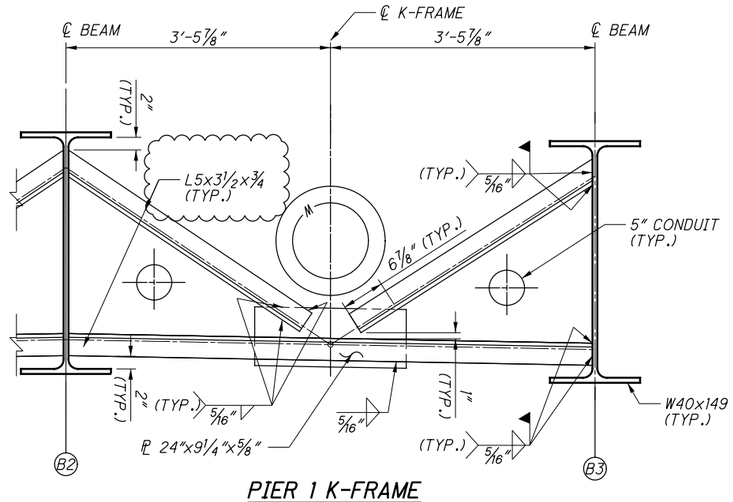
21 / 37

23 / 39

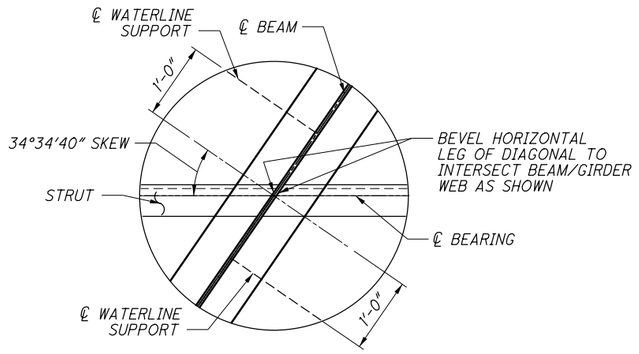
BU-25 - E 89TH ST PEDESTRIAN BRIDGE
...\Sheets\4015_ST701.dgn 12/17/2024 12:01:16 PM Gregory.Hertler



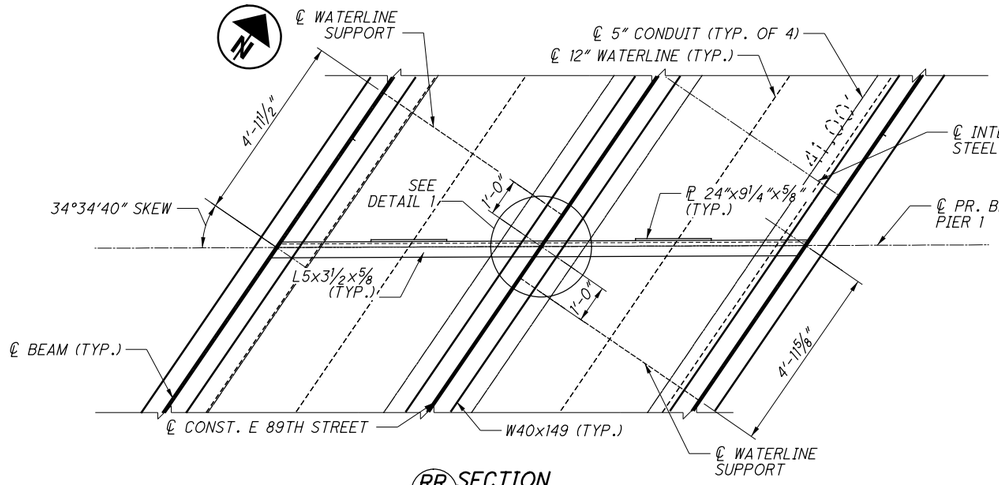
TRANSVERSE SECTION - PIER 1 K-FRAME
(SHOWN ALONG SKEW)



PIER 1 K-FRAME
(SHOWN ALONG SKEW)



DETAIL 1



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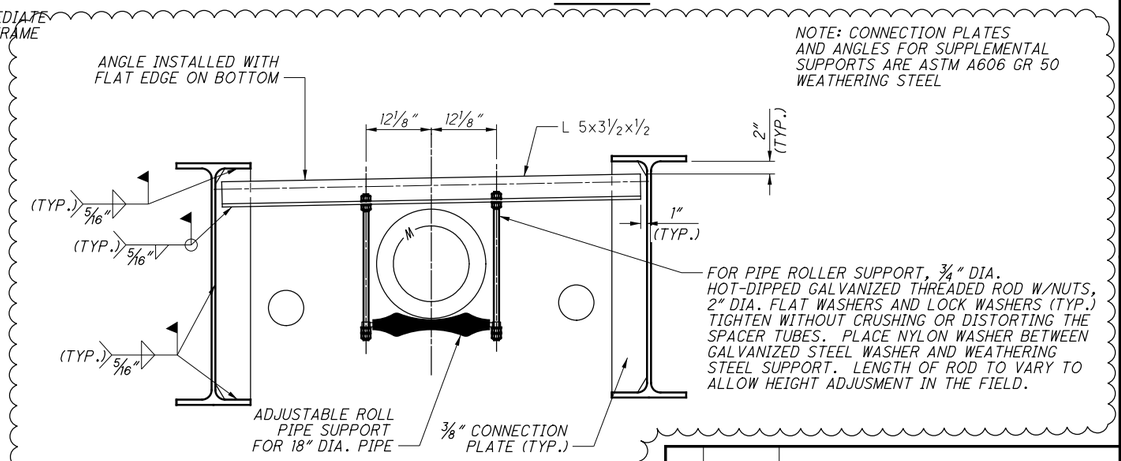

NOTE: CONNECTION PLATES AND ANGLES FOR SUPPLEMENTAL SUPPORTS ARE ASTM A606 GR 50 WEATHERING STEEL

WATERLINE SUPPLEMENTAL PIPE SUPPORT

NOTES:

1. GRAFFITI PROTECTION SHALL BE APPLIED TO PARAPETS. SEE SHEETS 25/37 TO 29/37 FOR RAILING & FENCE DETAILS.
2. SEE STANDARD DRAWING EXJ-4-87 AND SHEET 32/37 FOR ADDITIONAL NOTES AND DETAILS.
3. REFER TO SHEET 34/37 FOR WATERLINE SUPPORT DETAILS.
4. ALL STEEL IS ASTM 709, GRADE 50W, UNLESS NOTED OTHERWISE.
5. REFER TO SHOP DRAWINGS FOR ALTERNATIVE WELD DETAIL FOR K-FRAMES.

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED	DRAWN	REVIEWED	DATE
JBM	HHH	MUR	09/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

TRANSVERSE SECTION AT PIER 1
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

22/37

24/39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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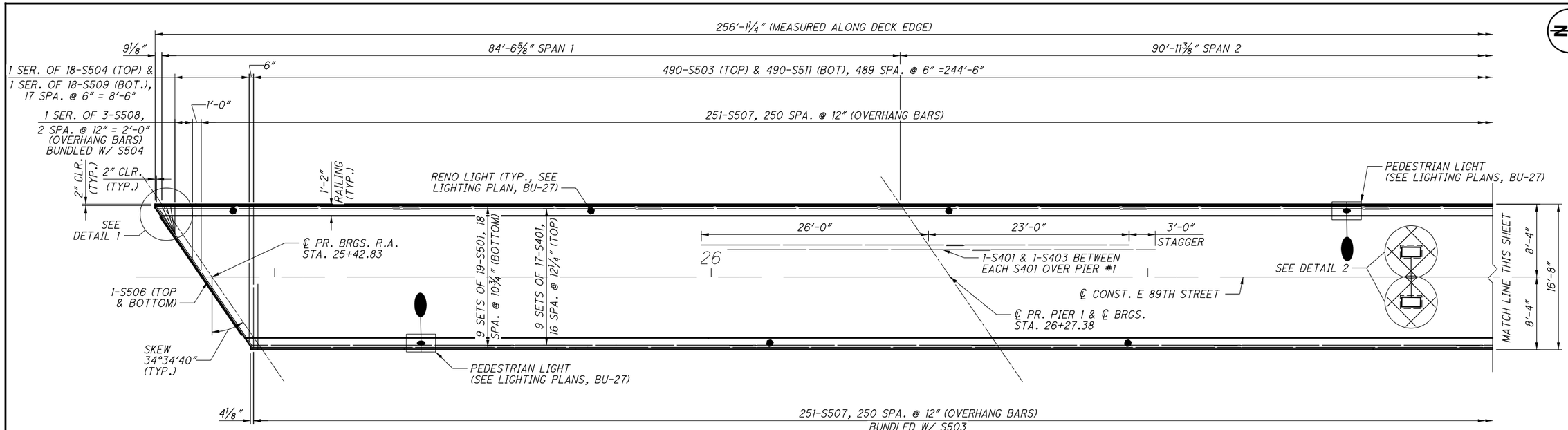
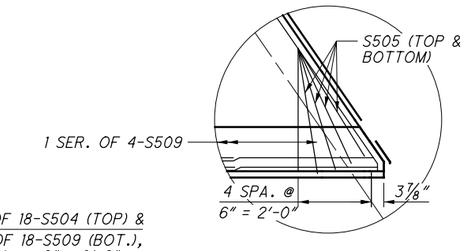
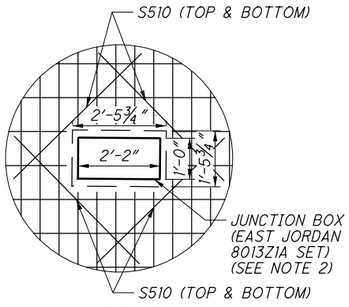


DECK PLAN

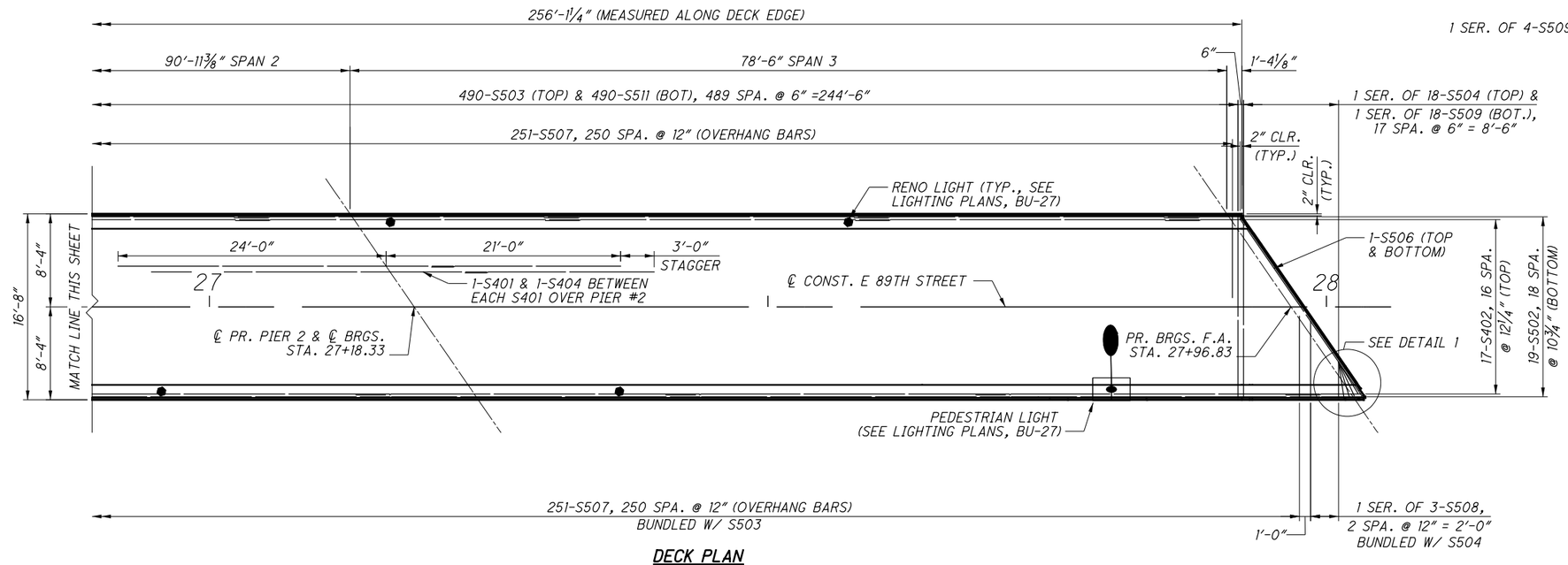


DETAIL 1



DETAIL 2

(AIR RELIEF VALVES, LOCATED AT STA. 26+80.17, 2'-10½" LT. & STA. 26+80.18, 2'-10½" RT.)



DECK PLAN

MIN. LAP LENGTH	
# 4	2'-7"
# 5	3'-2"

NOTES:

1. SEE SHEET 21/37 FOR TRANSVERSE SECTION.
2. FIELD CUT LONGITUDINAL AND TRANSVERSE REBAR TO AVOID INTERFERENCE WITH JUNCTION BOX.
3. SEE SHEET 36/37 FOR REINFORCING SCHEDULE.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED JBM | DRAWN MAK | REVIEWED MUR | DATE 09/23/19
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RECORD PLANS

DECK PLAN
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

23/37
25/39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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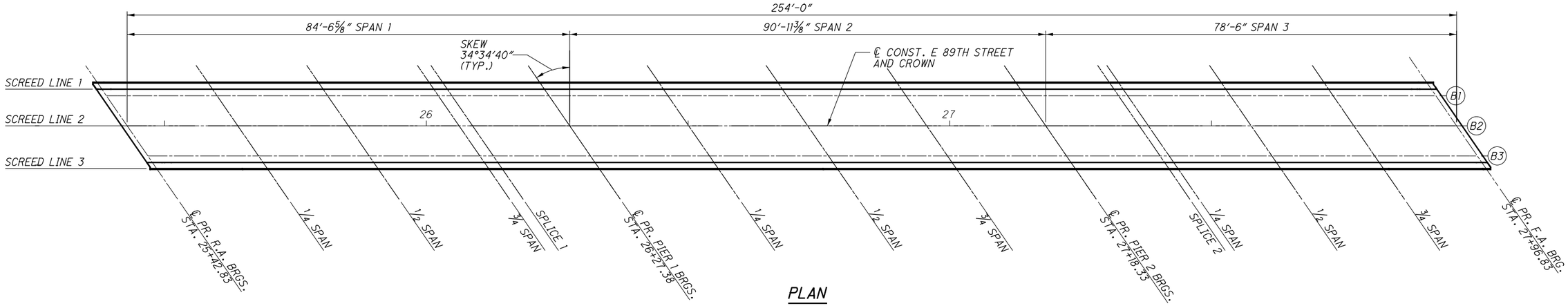


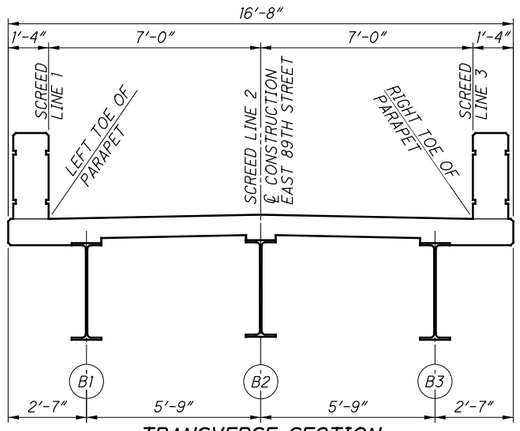
PLAN

SCREED ELEVATION TABLE

SCREED LINE	DESCRIPTION	℄ RA BRG.	SPAN 1				℄ PIER 1 BRG.	SPAN 2			℄ PIER 2 BRG.	SPAN 3				℄ FA BRG.
			1/4 SPAN	1/2 SPAN	3/4 SPAN	SPLICE 1		1/4 SPAN	1/2 SPAN	3/4 SPAN		SPLICE 2	1/4 SPAN	1/2 SPAN	3/4 SPAN	
LEFT TOE OF PARAPET SCREED LINE 1	STATION	25+38.01	25+59.14	25+80.28	26+01.42	26+04.01	26+22.56	26+45.29	26+68.03	26+90.77	27+13.51	27+31.38	27+33.13	27+52.76	27+72.38	27+92.01
	FINAL DECK EL.	704.20	704.81	705.41	706.02	706.10	706.63	707.21	707.42	707.25	706.69	705.98	705.90	704.99	704.09	703.18
	SCREED EL.	704.20	704.92	705.56	706.10	706.16	706.63	707.23	707.48	707.28	706.69	706.03	705.95	705.10	704.17	703.18
℄ CONST. E. 89TH SCREED LINE 2	STATION	25+42.83	25+63.97	25+85.11	26+06.24	26+08.83	26+27.38	26+50.12	26+72.86	26+95.59	27+18.33	27+36.20	27+37.96	27+57.58	27+77.21	27+96.83
	FINAL DECK EL.	704.48	705.08	705.69	706.30	706.38	706.91	707.42	707.56	707.31	706.67	705.90	705.82	704.91	704.01	703.10
	SCREED EL.	704.48	705.20	705.84	706.38	706.44	706.91	707.45	707.62	707.34	706.67	705.95	705.87	705.02	704.09	703.10
RIGHT TOE OF PARAPET SCREED LINE 3	STATION	25+47.65	25+68.79	25+89.93	26+11.07	26+13.65	26+32.21	26+54.94	26+77.68	27+00.42	27+23.15	27+41.02	27+42.78	27+62.40	27+82.03	28+01.65
	FINAL DECK EL.	704.47	705.08	705.69	706.30	706.38	706.90	707.34	707.40	707.06	706.34	705.54	705.46	704.55	703.64	702.74
	SCREED EL.	704.47	705.20	705.83	706.38	706.44	706.90	707.37	707.45	707.09	706.34	705.58	705.51	704.65	703.73	702.74

TOP OF HAUNCH AND FINAL DECK ELEVATIONS TABLE

SCREED LINE	DESCRIPTION	℄ RA BRG.	SPAN 1				℄ PIER 1 BRG.	SPAN 2			℄ PIER 2 BRG.	SPAN 3				℄ FA BRG.
			1/4 SPAN	1/2 SPAN	3/4 SPAN	SPLICE 1		1/4 SPAN	1/2 SPAN	3/4 SPAN		SPLICE 2	1/4 SPAN	1/2 SPAN	3/4 SPAN	
BEAM 1	STATION	25+38.87	25+60.00	25+81.14	26+02.28	26+04.87	26+23.42	26+46.16	26+68.89	26+91.63	27+14.37	27+32.24	27+33.99	27+53.62	27+73.24	27+92.87
	FINAL DECK EL.	704.25	704.86	705.46	706.07	706.15	706.68	707.25	707.45	707.26	706.69	705.97	705.89	704.98	704.07	703.17
	TOP OF HAUNCH	703.58	704.304	704.939	705.482	705.545	706.015	706.603	706.837	706.625	706.023	705.348	705.273	704.415	703.490	702.500
	SCREED EL.	704.25	704.97	705.61	706.15	706.21	706.68	707.27	707.50	707.29	706.69	706.01	705.94	705.08	704.16	703.17
BEAM 2	STATION	25+42.83	25+63.97	25+85.11	26+06.24	26+08.83	26+27.38	26+50.12	26+72.86	26+95.59	27+18.33	27+36.20	27+37.96	27+57.58	27+77.21	27+96.83
	FINAL DECK EL.	704.48	705.08	705.69	706.30	706.38	706.91	707.42	707.56	707.31	706.67	705.90	705.82	704.91	704.01	703.10
	TOP OF HAUNCH	703.81	704.537	705.173	705.713	705.776	706.244	706.782	706.949	706.669	705.998	705.281	705.206	704.350	703.424	702.432
	SCREED EL.	704.48	705.20	705.84	706.38	706.44	706.91	707.45	707.62	707.34	706.67	705.95	705.87	705.02	704.09	703.10
BEAM 3	STATION	25+46.79	25+67.93	25+89.07	26+10.21	26+12.79	26+31.35	26+54.08	26+76.82	26+99.56	27+22.29	27+40.16	27+41.92	27+61.54	27+81.17	28+00.79
	FINAL DECK EL.	704.47	705.08	705.69	706.30	706.38	706.90	707.36	707.43	707.11	706.40	705.60	705.52	704.61	703.71	702.80
	TOP OF HAUNCH	703.81	704.532	705.168	705.710	705.773	706.238	706.717	706.816	706.469	705.732	704.981	704.906	704.049	703.123	702.134
	SCREED EL.	704.47	705.20	705.83	706.38	706.44	706.90	707.38	707.48	707.14	706.40	705.65	705.57	704.72	703.79	702.80



TRANSVERSE SECTION

LEGEND

(BX) BEAM DESIGNATION

NOTES

1. DEAD LOAD DEFLECTIONS USED TO DETERMINE SCREED ELEVATIONS ACCOUNT FOR THE LOADING OF THE RAILING, FENCING AND WATER WITHIN THE WATERLINE. THE WEIGHT OF THE WATERLINE WAS INCLUDED WITH THE SELF WEIGHT LOAD OF THE BEAMS.
2. SCREED ELEVATIONS SHOWN REPRESENT THE THEORETICAL DECK SURFACE LOCATION PRIOR TO DEFLECTIONS CAUSED BY DECK PLACEMENT AND OTHER ANTICIPATED DEAD LOADS.
3. TOP OF HAUNCH ELEVATIONS SHOWN REPRESENT THE THEORETICAL LOCATION OF THE BOTTOM OF THE DECK ABOVE THE BEAM/GIRDER HAUNCH PRIOR TO DEFLECTIONS CAUSED BY DECK PLACEMENT AND OTHER ANTICIPATED DEAD LOADS.
4. FINAL DECK SURFACE ELEVATIONS SHOWN REPRESENT THE DECK SURFACE LOCATION AFTER ALL ANTICIPATED DEAD LOAD DEFLECTIONS HAVE OCCURRED.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED JBM | DRAWN MAK | CHECKED JAH | REVIEWED MUR | DATE 09/23/19 | REVISED | STRUCTURE FILE NUMBER TBD

RECORD PLANS

SCREEDS, TOP OF HAUNCH & FINAL DECK ELEVATIONS

CUY-E89ST-4015 (EAST 89TH STREET)

PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28

PID No. 96833

24 / 37

26 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE

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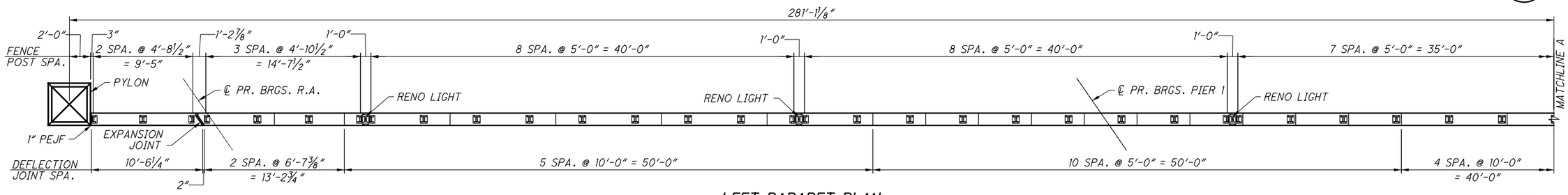
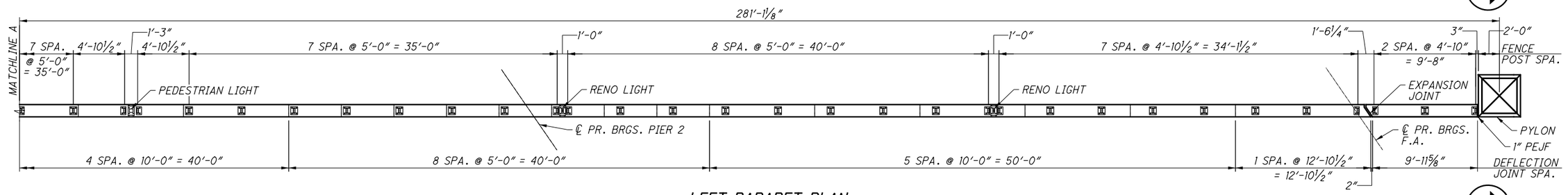
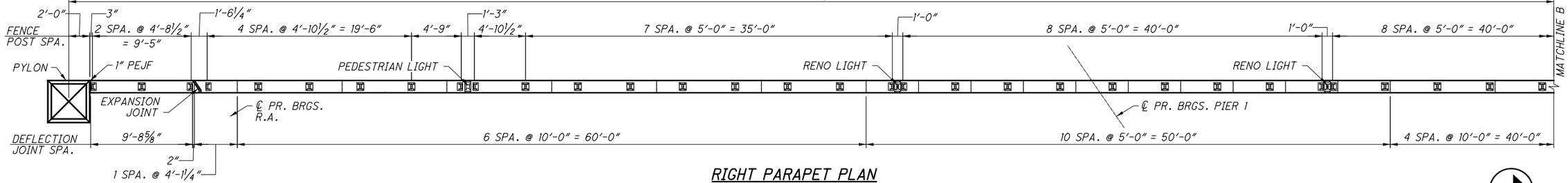


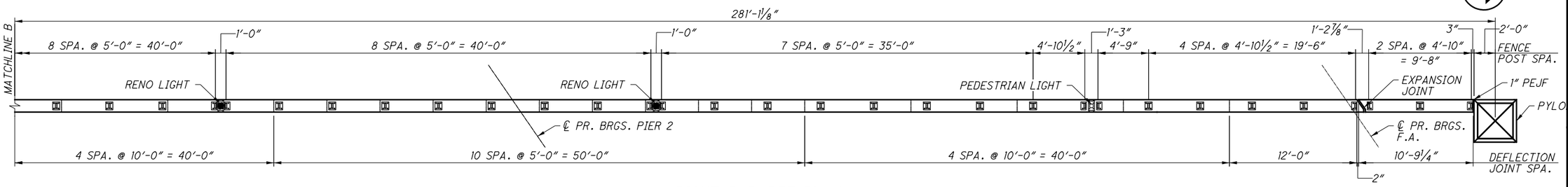
LEFT PARAPET PLAN



LEFT PARAPET PLAN



RIGHT PARAPET PLAN



RIGHT PARAPET PLAN

NOTE:

1. ALL DIMENSIONS MEASURED ALONG TOE OF PARAPET.
2. SEE STD. DWG. BR-2-15 FOR ADDITIONAL RAILING DEFLECTION JOINT DETAILS.
3. RENO LIGHT COLUMNS ARE BY HESSAMERICA, PRODUCT CODE: REN3200-LED2-10RB-GG OR APPROVED EQUAL. CONDUIT SHALL BE EMBEDDED AND NOT VISIBLE.
4. FOR PARAPET ELEVATIONS, SEE SHEETS 26/37 AND 27/37.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED JBM | DRAWN JBM | CHECKED JAH | REVIEWED MUR | DATE 09/23/19 | REVISED | STRUCTURE FILE NUMBER TBD

RECORD PLANS

PARAPET PLAN
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

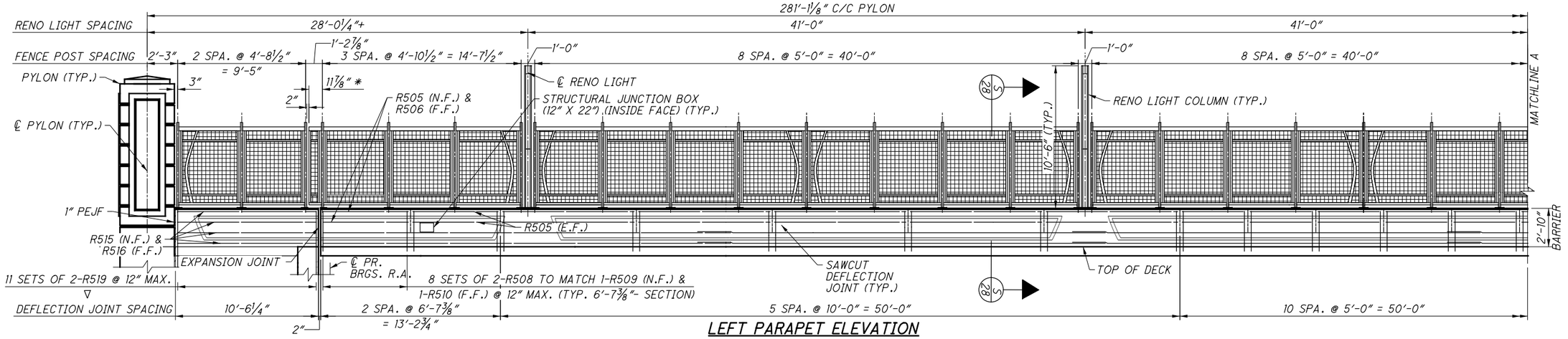
RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

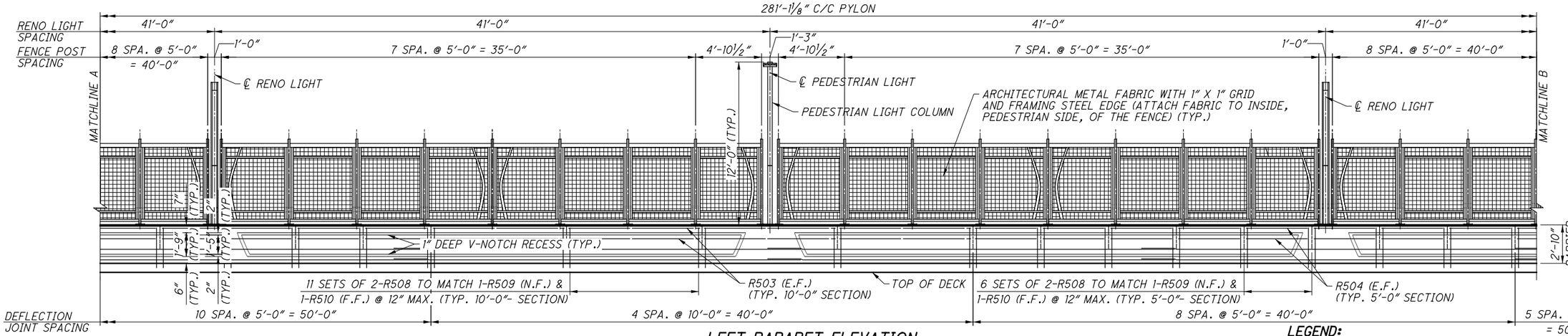
25/37

27/39

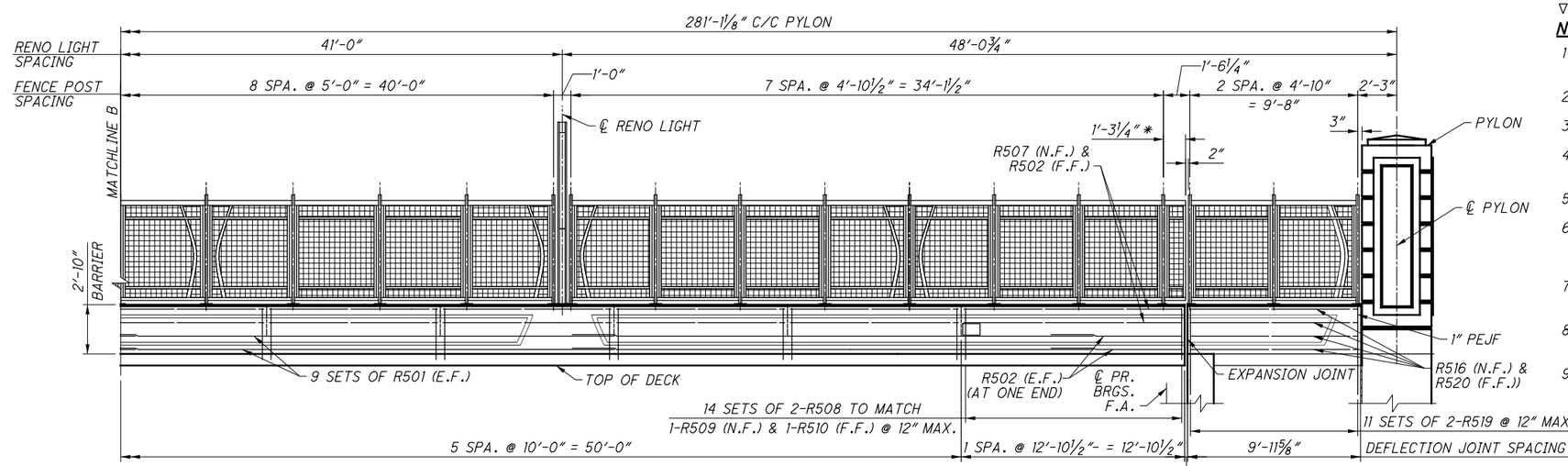
BU-25 - E 89TH ST PEDESTRIAN BRIDGE
...\Sheets\4015_SA705.dgn 11/19/2019 6:25:14 AM Julia_Hart



LEFT PARAPET ELEVATION
(INSIDE FACE OF LEFT PARAPET)



LEFT PARAPET ELEVATION
(INSIDE FACE OF LEFT PARAPET CONTINUED)



LEFT PARAPET ELEVATION
(INSIDE FACE OF LEFT PARAPET CONTINUED)

LEGEND:

* - PORTION OF FENCING IS TO BE CANTILEVERED OVER EXPANSION JOINT

∇ - 1 ADDITIONAL SET OF 2-R519 PLACED PARALLEL TO JOINT

NOTE:

1. SEE STD. DWG. BR-2-15 FOR ADDITIONAL RAILING SAWCUT DETAILS.
2. FOR PARAPET PLAN, SEE SHEET 25/37 .
3. FOR RIGHT PARAPET ELEVATION, SEE SHEET 27/ 37
4. FOR LAP LENGTHS AND REINFORCING DETAILS, SEE SHEET 28/37 .
5. FOR REINFORCING SCHEDULE, SEE SHEET 37/ 37
6. RENO LIGHT COLUMNS ARE BY HESSAMERICA, PRODUCT CODE: REN3200-LED2-10RB-GG OR APPROVED EQUAL. CONDUIT SHALL BE EMBEDDED AND NOT VISIBLE.
7. PROVIDE STRUCTURE GROUNDING FOR FENCE AS PER STD. DWG. HL-50.21.
8. FOR ADDITIONAL DETAILS ON LIGHTING CONDUIT, SEE STD. DWG. HL-30.32 AND LIGHTING PLANS IN BU-27.
9. ALL DIMENSIONS MEASURED ALONG TOE OF PARAPET.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN, Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED	DRAWN	REVIEWED	DATE
JBM	MAK	MUR	09/23/19
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JAH		TBD	

RECORD PLANS

LEFT PARAPET ELEVATION
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

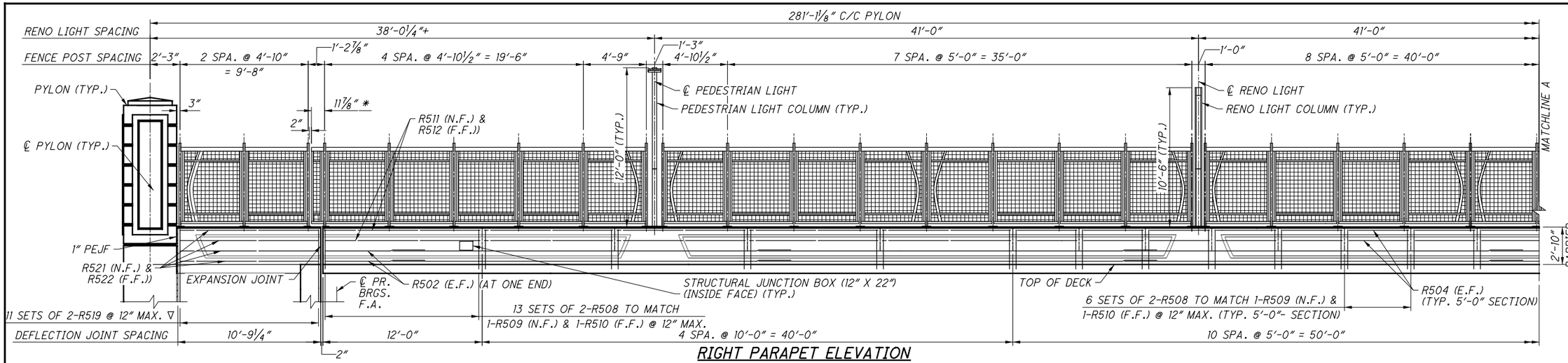
RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

26 / 37

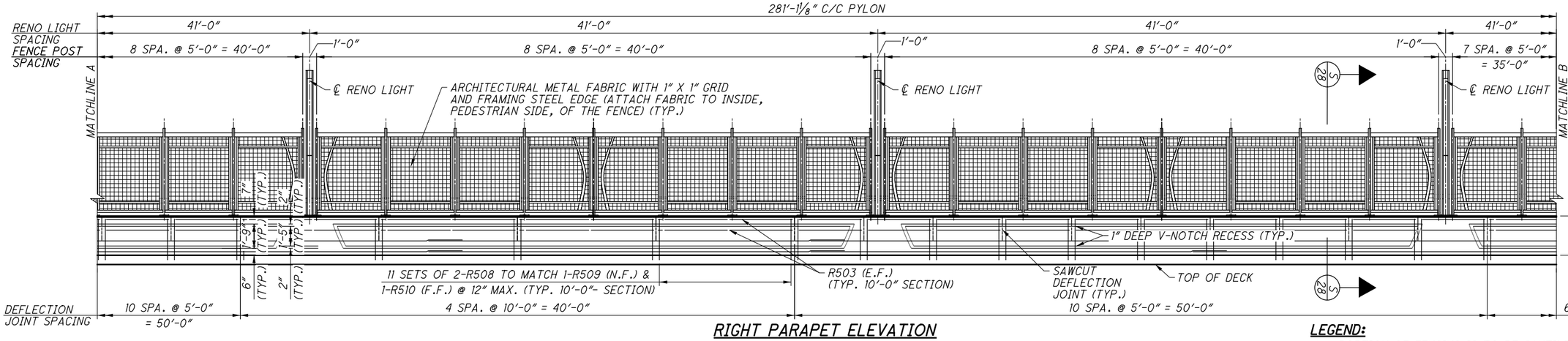
28 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
...\Sheets\4015_SA701.dgn 11/19/2019 6:25:34 AM Julia_Hart



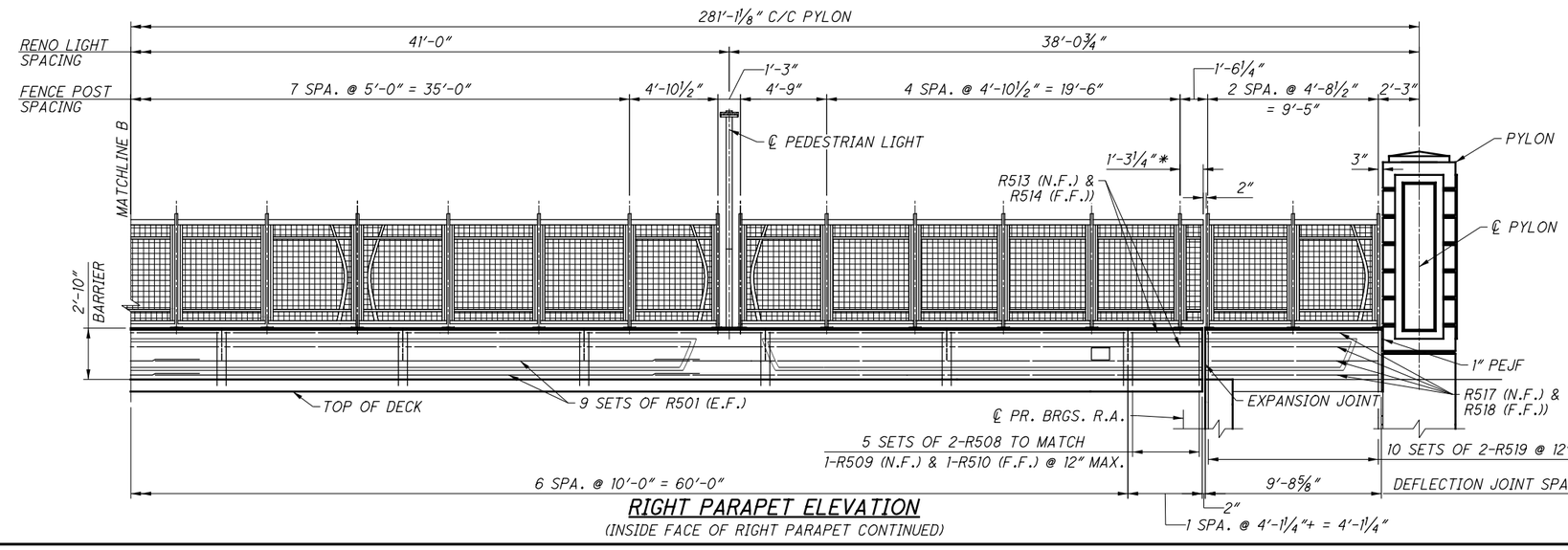
RIGHT PARAPET ELEVATION

(INSIDE FACE OF RIGHT PARAPET CONTINUED)



RIGHT PARAPET ELEVATION

(INSIDE FACE OF RIGHT PARAPET CONTINUED)



RIGHT PARAPET ELEVATION

(INSIDE FACE OF RIGHT PARAPET CONTINUED)

LEGEND:

* - PORTION OF FENCING IS TO BE CANTILEVERED OVER EXPANSION JOINT

▽ - 1 ADDITIONAL SET OF 2-R519 PLACED PARALLEL TO JOINT

NOTE:

1. SEE STD. DWG. BR-2-15 FOR ADDITIONAL RAILING SAWCUT DETAILS.
2. FOR PARAPET PLAN, SEE SHEET 25/37 .
3. FOR LEFT PARAPET ELEVATION, SEE SHEET 26/37 .
4. FOR LAP LENGTHS AND REINFORCING DETAILS, SEE SHEET 28/37 .
5. FOR REINFORCING SCHEDULE, SEE SHEET 37/37 .
6. RENO LIGHT COLUMNS ARE BY HESSAMERICA, PRODUCT CODE: REN3200-LED2-10RB-GG OR APPROVED EQUAL. CONDUIT SHALL BE EMBEDDED AND NOT VISIBLE.
7. PROVIDE STRUCTURE GROUNDING FOR FENCE AS PER STD. DWG. HL-50.21.
8. FOR ADDITIONAL DETAILS ON LIGHTING CONDUIT, SEE STD. DWG. HL-30.32 AND LIGHTING PLANS IN BU-27.
9. ALL DIMENSIONS MEASURED ALONG TOE OF PARAPET.

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RECORD PLANS

RIGHT PARAPET ELEVATION
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

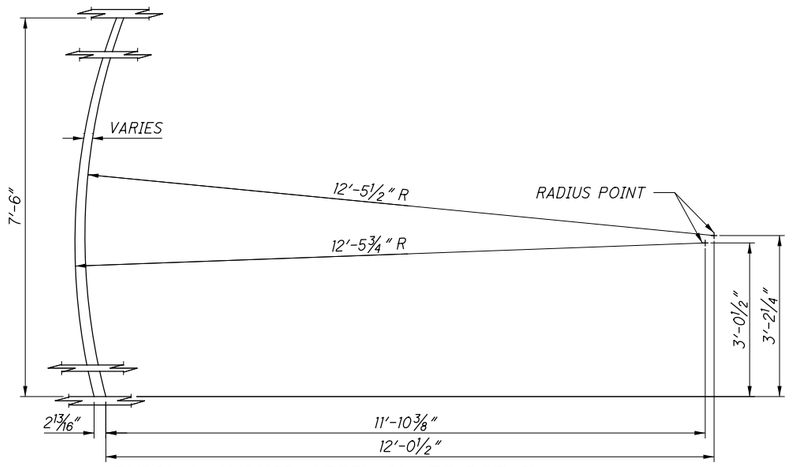
RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

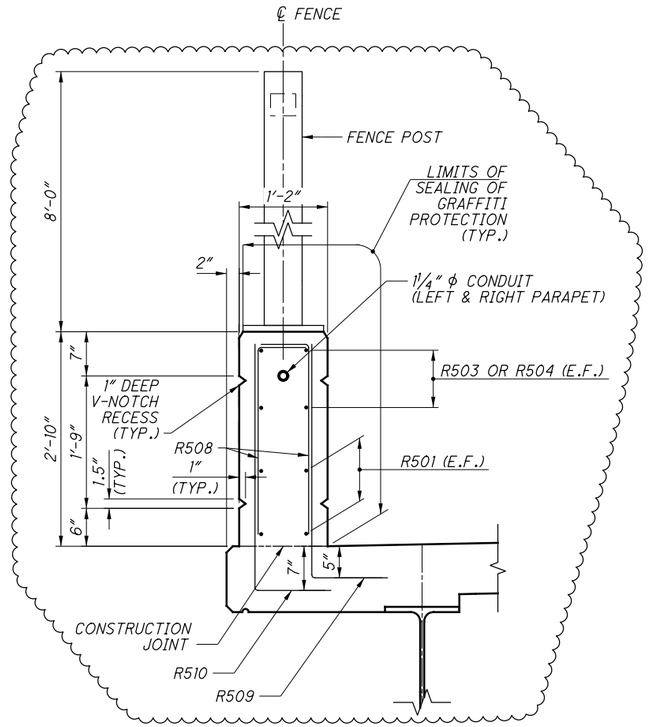
27 / 37

29 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
..\Sheets\4015_SA704.dgn 11/19/2019 6:25:55 AM Julia_Hart

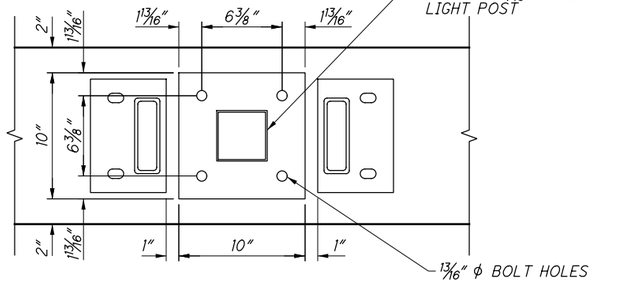


TYPICAL CURVED STEEL PLATE DETAIL

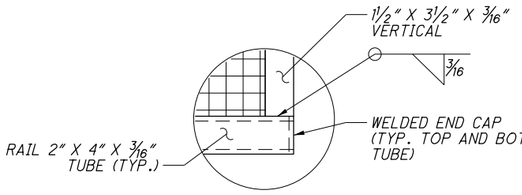


S/26 SECTION

S/27 SECTION

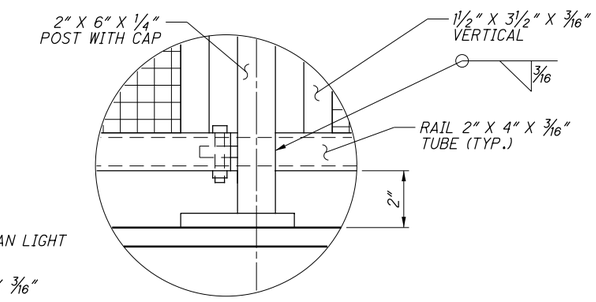


DETAIL 3



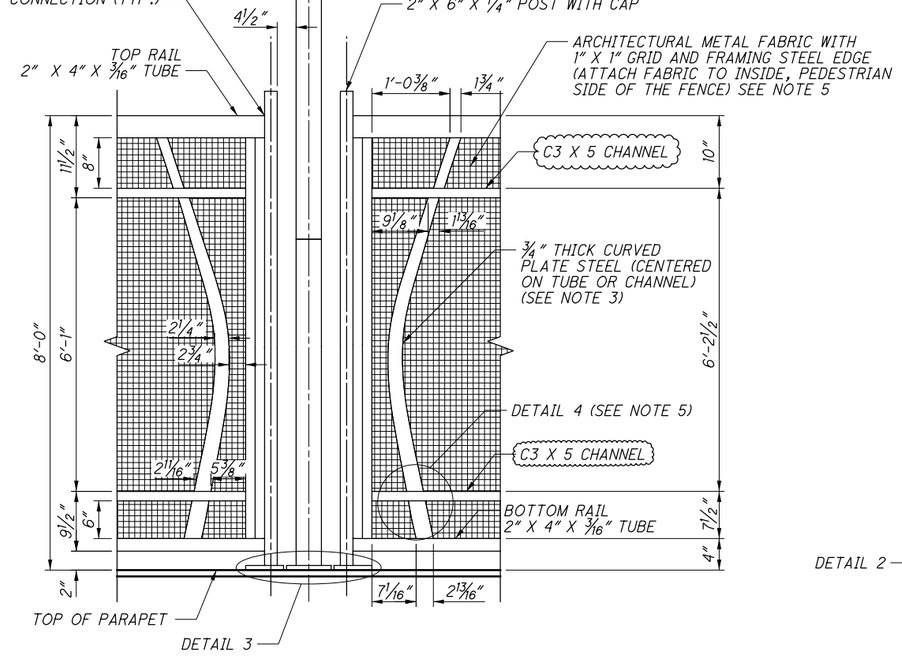
DETAIL 1

(TYP. TOP AND BOTTOM)



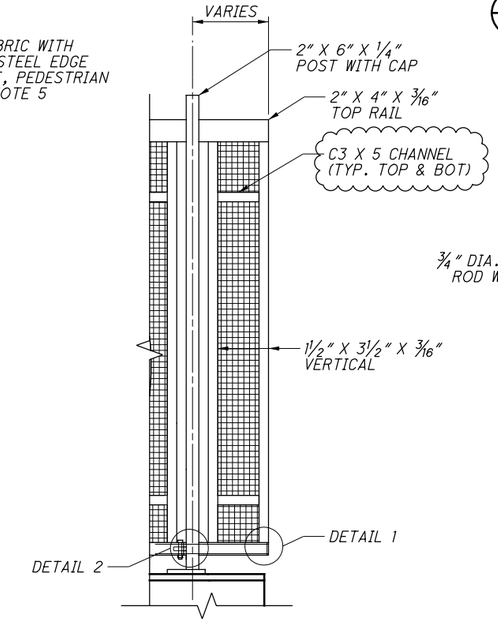
DETAIL 2

(TYP. TOP AND BOTTOM)



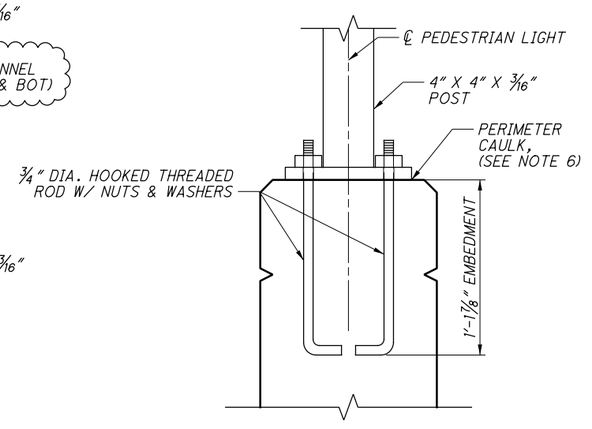
PEDESTRIAN LIGHT FENCE DETAILS

(PLACE FABRIC ON INSIDE, PEDESTRIAN SIDE OF THE FENCE)
(FENCE FABRIC FASTENERS NOT SHOWN)



TYPICAL CANTILEVERED FENCE PANEL ELEVATION DETAIL

(PLACE FABRIC ON INSIDE, PEDESTRIAN SIDE OF THE FENCE)
(FENCE FABRIC FASTENERS NOT SHOWN)



PEDESTRIAN LIGHT ANCHOR BOLT DETAILS

THREADED ROD SHALL BE ASTM A320 B8
CLASS 2 HARDENED STAINLESS STEEL (ANSI 304),
Fy=100 KSI, WITH ASTM A194 GRADE 8
NUTS AND SS304 WASHERS

NOTE:

1. FOR PARAPET PLAN AND LOCATION OF PEDESTRIAN LIGHT POLES, SEE SHEET 25/37 .
2. FOR REINFORCING SCHEDULE, SEE SHEET 37/37 .
3. PEDESTRIAN LIGHT COLUMNS SHALL BE COOPER GALLEON LED FIXTURES ON 4" SQUARE, 12' HIGH ALUMINUM POLE, OR APPROVED EQUAL. CONDUIT SHALL BE EMBEDDED AND NOT VISIBLE.
4. FOR DETAIL 4, SEE SHEET 29/37 .
5. FENCING FABRIC AND HARDWARE SHALL BE COLOR: BLACK - FEDERAL, STANDARD 595C #17038
6. SEE STD. DWG. VPF-1-90 FOR ADDITIONAL NOTES AND DETAILS RELATED TO BASE PLATE SHIMS AND CAULKING.

MIN. LAP LENGTH	
#5	2'-5"

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0	2019-09-30	RFC

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JAH		TBD	

RECORD PLANS

PARAPET DETAILS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

28 / 37

30 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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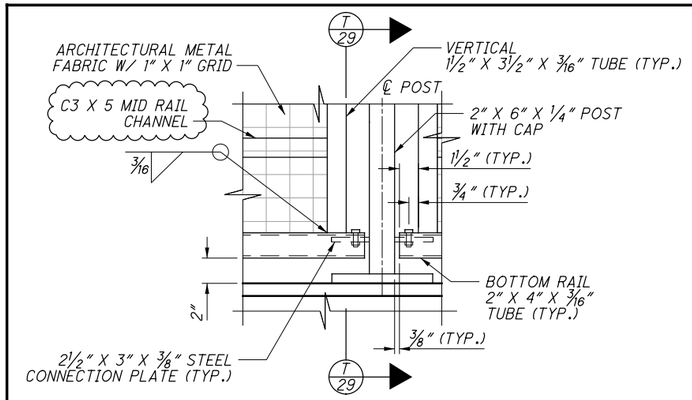
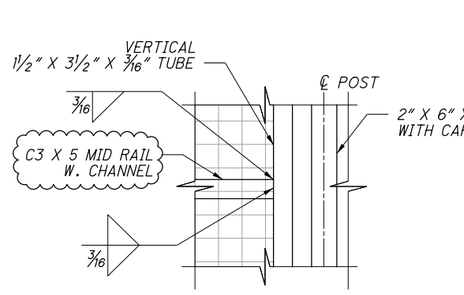


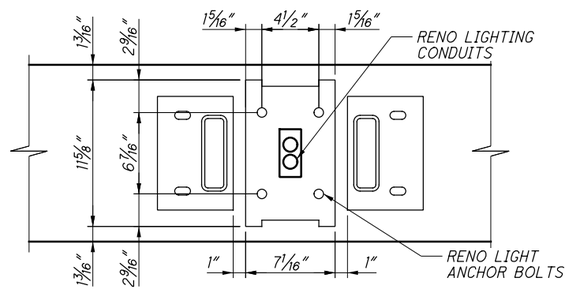
DETAIL 1

(FENCE FABRIC FASTENERS NOT SHOWN)

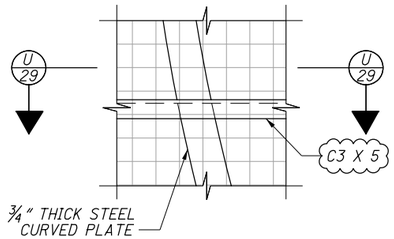


DETAIL 2

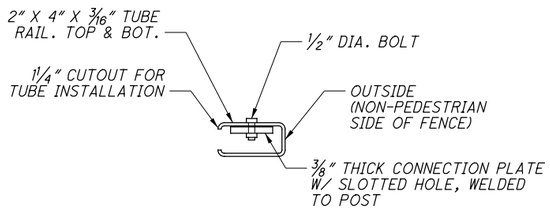
(FENCE FABRIC FASTENERS NOT SHOWN)



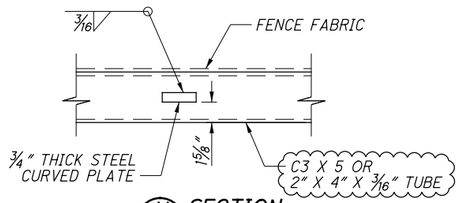
DETAIL 3



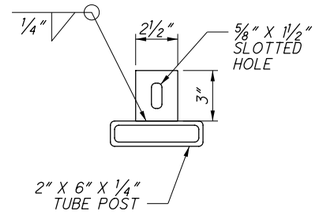
DETAIL 4



T 29 SECTION

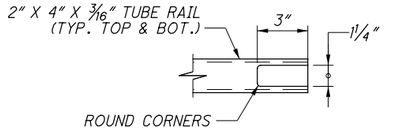


U 29 SECTION

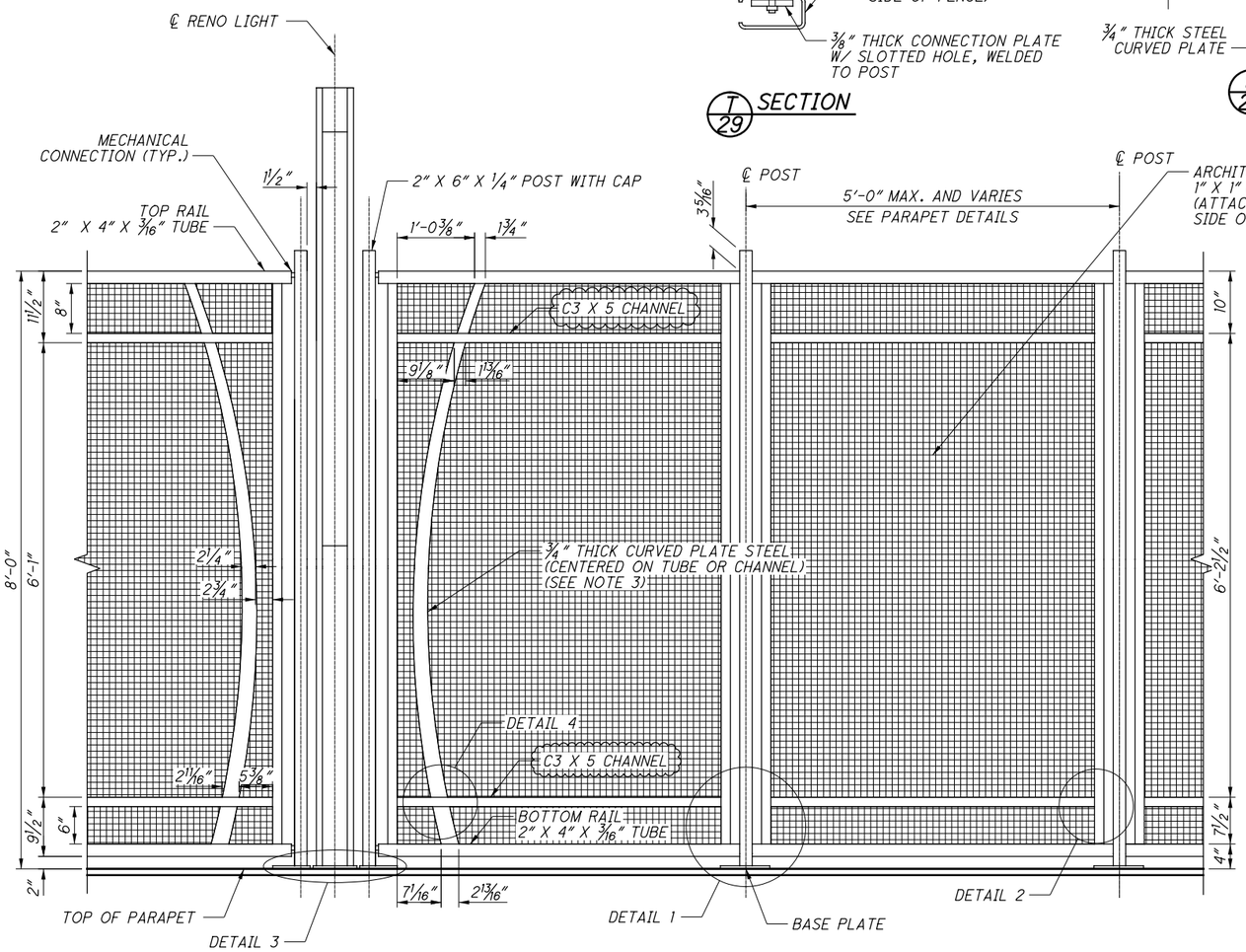


CONNECTION PLATE DETAILS

(PLAN VIEW)

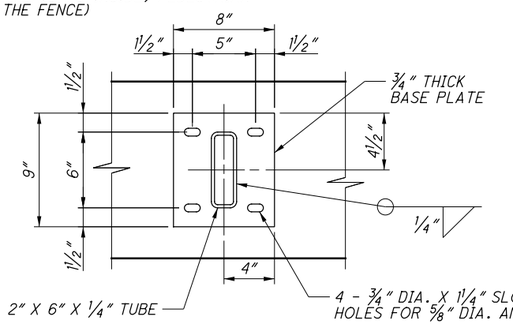


TYPICAL TUBE CUTOUT DETAIL

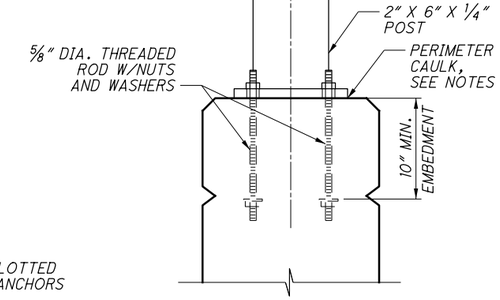


RENO LIGHT FENCE AND TYPICAL FENCE PANEL DETAILS

(PLACE FABRIC ON INSIDE, PEDESTRIAN SIDE OF THE FENCE)
(FENCE FABRIC FASTENERS NOT SHOWN)

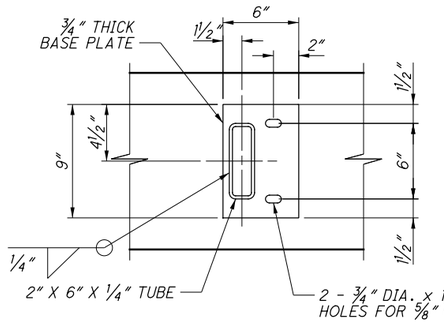


TYPICAL MID-POST BASE PLATE DETAIL



TYPICAL ANCHOR BOLT DETAILS

THREADED ROD SHALL BE ASTM A320 B8
CLASS 2 HARDENED STAINLESS STEEL (ANSI 304),
Fy=100 KSI, WITH ASTM A194 GRADE 8
NUTS AND SS304 WASHERS



TYPICAL END POST BASE PLATE DETAIL

NOTES:

1. ALL POSTS SHALL BE INSTALLED PLUMB. PROVIDE SHIMS MADE FROM MULTI-POLYMER PLASTIC WITH MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI. ENDS OF POSTS MAY BE CUT ON BIAS TO PROVIDE PLUMB INSTALLATION.
2. SEE STD. DWG. VPF-1-90 FOR ADDITIONAL NOTES AND DETAILS RELATED TO BASE PLATE SHIMS AND CAULKING.
3. FOR CURVED STEEL PLATE DETAILS, SEE SHEET 25/37.
4. PROVIDE GROUNDING OF RENO LIGHT ANCHOR BOLTS PER STD. DWG. HL-50.21.

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

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RECORD PLANS

PARAPET AND FENCE DETAILS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

29 / 37

31
39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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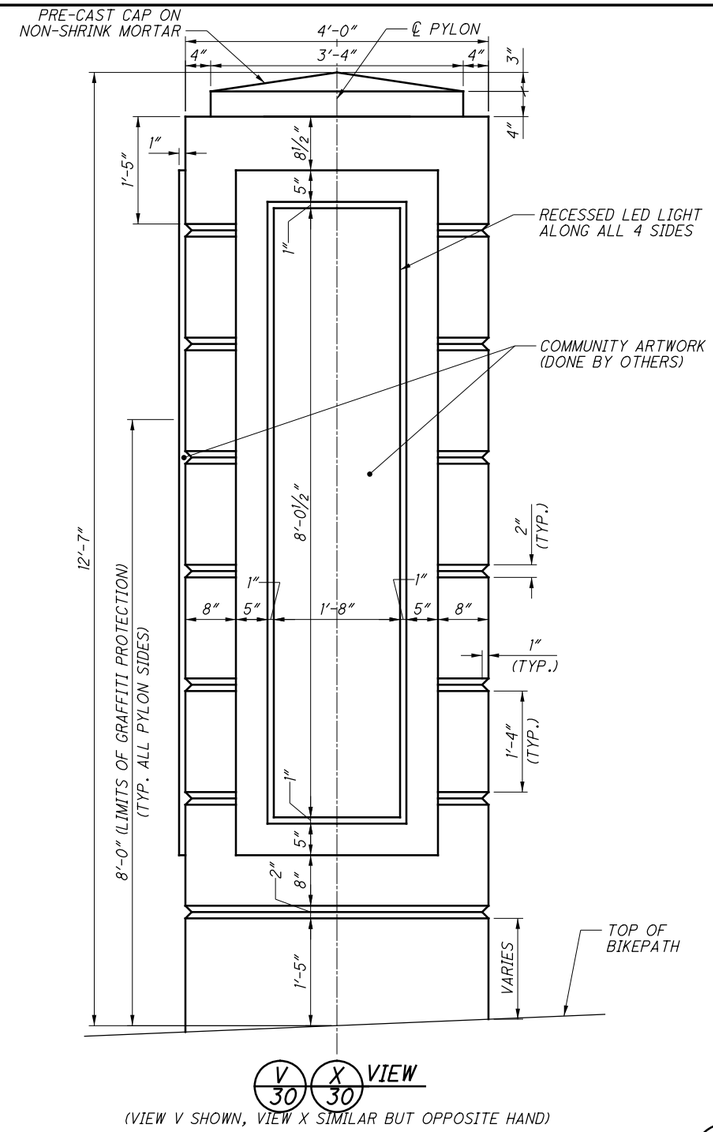
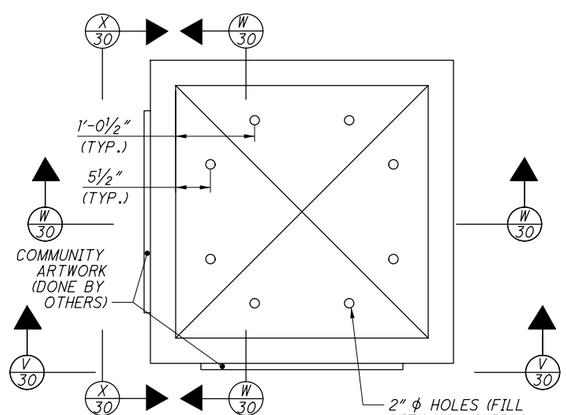
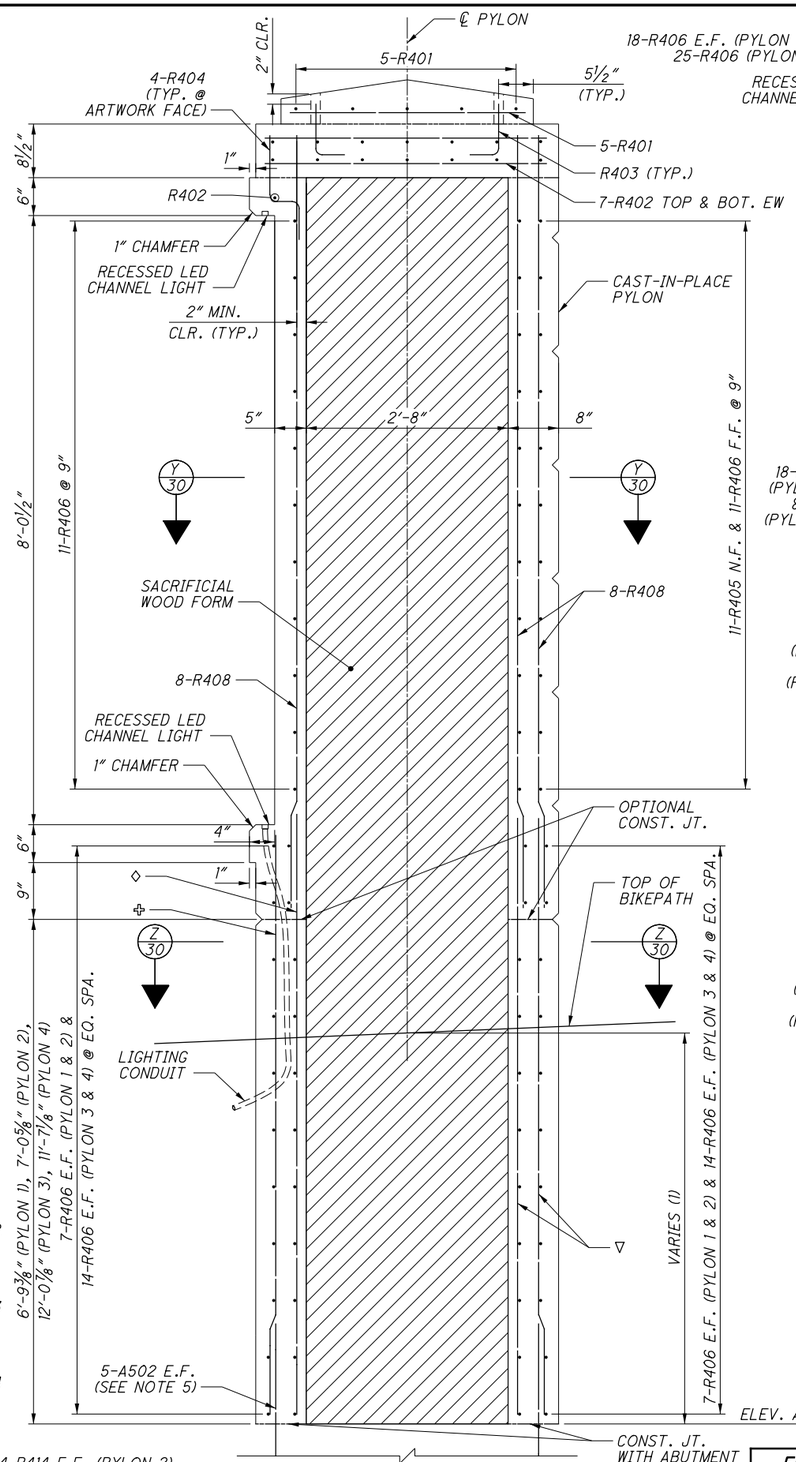


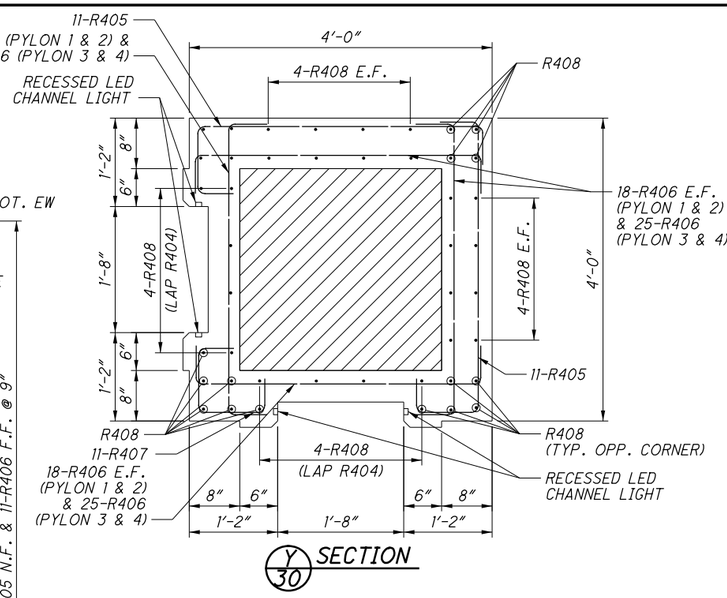
V/30 X/30 VIEW

(VIEW V SHOWN, VIEW X SIMILAR BUT OPPOSITE HAND)

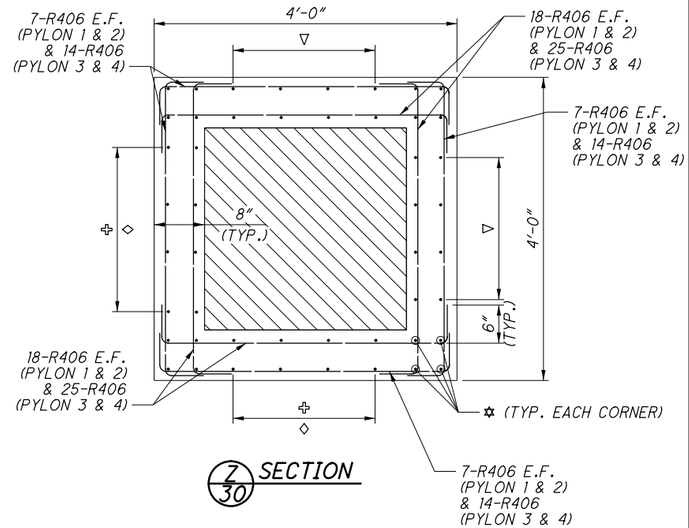


PLAN





Y/30 SECTION



Z/30 SECTION

PYLON 1

PYLON 2

PYLON 3

PYLON 4

LEGEND:

▽- 4-R413 E.F. (PYLON 1), 4-R414 E.F. (PYLON 2), 4-R415 E.F. (PYLON 3), 4-R416 E.F. (PYLON 4)

✣- 4-R409 N.F. (PYLON 1), 4-R410 N.F. (PYLON 2), 4-R411 N.F. (PYLON 3), 4-R412 N.F. (PYLON 4)

◇- 4-R413 F.F. (PYLON 1), 4-R414 F.F. (PYLON 2), 4-R415 F.F. (PYLON 3), 4-R416 F.F. (PYLON 4)

✡ - R413 (PYLON 1), R414 (PYLON 2), R415 (PYLON 3), R416 (PYLON 4)

W/30 SECTION (SEE NOTE 5)

PYLON NUMBER	DIMENSION (1)
PYLON 1	5'-3⅜"
PYLON 2	5'-6⅝"
PYLON 3	10'-6⅛"
PYLON 4	10'-1⅛"

ELEVATION TABLE

PYLON NUMBER	ELEV. A
PYLON 1	698.50
PYLON 2	698.50
PYLON 3	692.00
PYLON 4	692.00

NOTES:

1. FOR LOCATION OF PYLONS, SEE SHEET 1/37.
2. SEAL ALL EXPOSED SURFACES OF PYLONS PER ITEM 512 SEALING OF CONCRETE SURFACES.
3. ALL CONCRETE SHALL BE CLASS QC2 WITH QC/QA.
4. FOR LIGHTING CONDUIT DETAILS, SEE THE LIGHTING PLANS IN BU-27.
5. FOR PYLON REBAR CONNECTION TO ABUTMENTS, SEE SHEETS 11/37 THROUGH 16/37.
6. SEE SHEETS 36/37 FOR REINFORCING SCHEDULE.

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DESIGNED MAK | DRAWN MAK | REVIEWED MUR | DATE 09/23/19
CHECKED JAH | REVISED | STRUCTURE FILE NUMBER TBD

RECORD PLANS

PYLON DETAILS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

30/37
32/39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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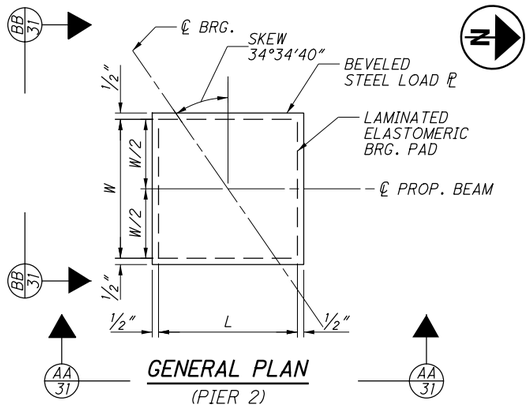
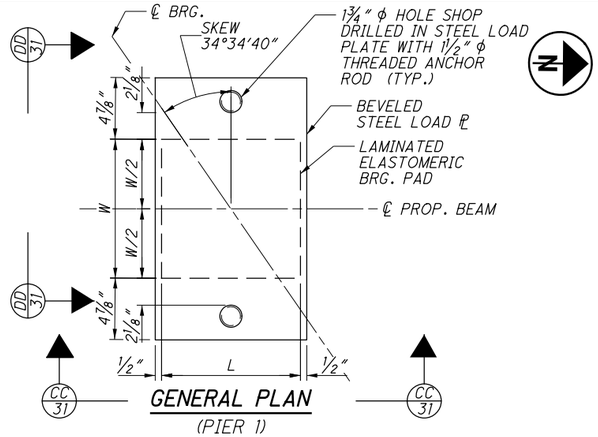
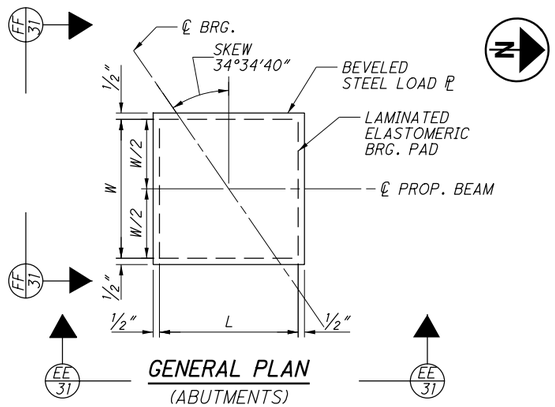


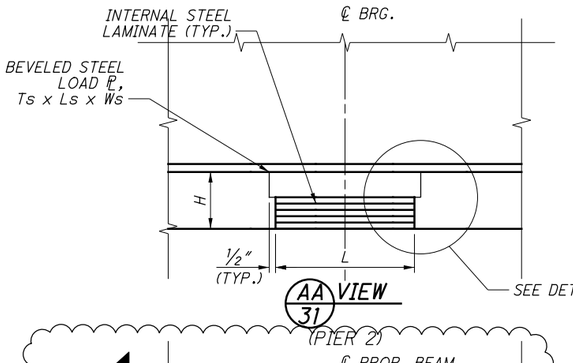
GENERAL PLAN
(PIER 2)



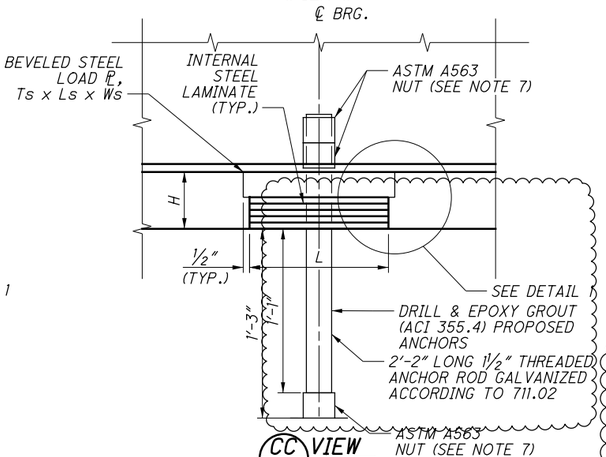
GENERAL PLAN
(PIER 1)



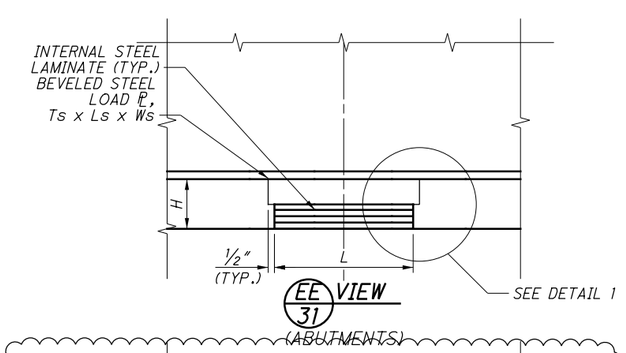
GENERAL PLAN
(ABUTMENTS)



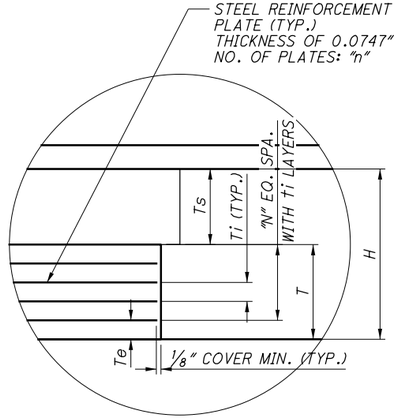
AA VIEW 31
(PIER 2)



CC VIEW 31
(PIER 1)

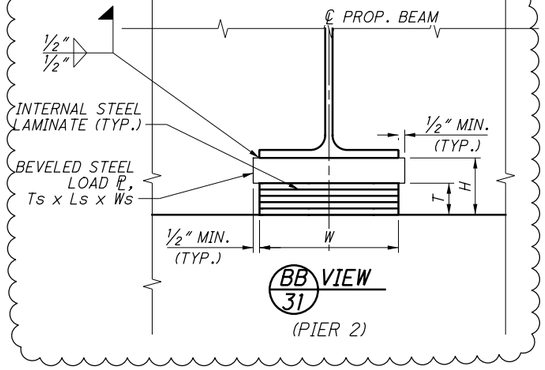


EE VIEW 31
(ABUTMENTS)

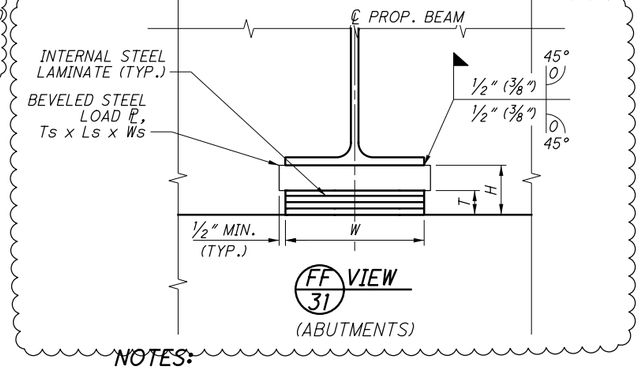


DETAIL 1

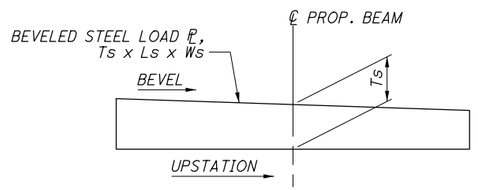
Ts = LOAD PLATE THICKNESS (IN)
Ti = INTERIOR ELASTOMER LAYER THICKNESS (IN)
Te = EXTERIOR ELASTOMER LAYER THICKNESS (IN)
N = NUMBER OF INTERIOR ELASTOMER LAYERS
n = NUMBER OF STEEL LAMINATE LAYERS
T = TOTAL BEARING HEIGHT (IN)
H = BEARING HEIGHT (T) + LOAD PLATE THICKNESS (Ts) (IN)



BB VIEW 31
(PIER 2)

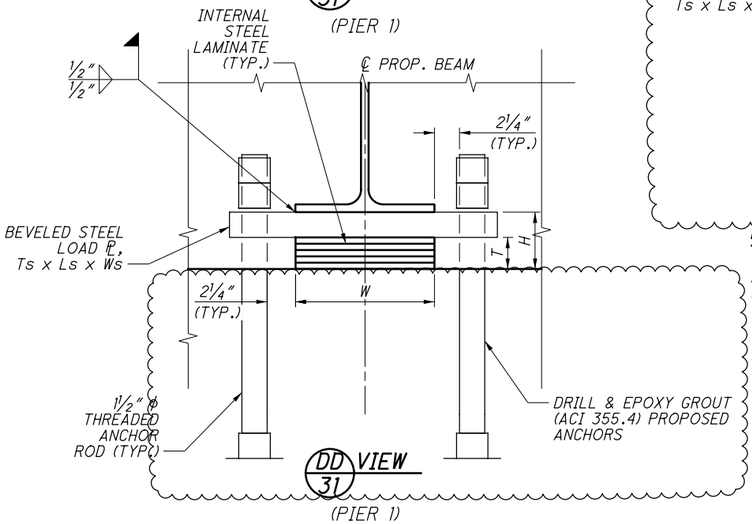


FF VIEW 31
(ABUTMENTS)



BEVELED STEEL LOAD PLATE DETAIL

(ABUTMENTS & PIERS)



DD VIEW 31
(PIER 1)

NOTES:

1. INTERNAL STEEL LAMINATE THICKNESS = 0.0747 INCH (16 GAGE).
2. CONTRACTOR TO VERIFY DIMENSIONS AS PER 501.
3. STEEL LOAD PLATE SHALL BE ASTM A709 GRADE 50W STEEL AND SHALL HAVE THE SAME PROTECTIVE COATING AS THE MAIN STRUCTURAL STEEL.
4. ELASTOMERIC BEARINGS: THE ELASTOMER SHALL HAVE A HARDNESS OF 50 DUROMETER. THE BEARINGS WERE DESIGNED UNDER SECTION 14.7.6 (METHOD A) OF THE AASHTO LRFD DESIGN SPECIFICATIONS.
5. ALL BEARINGS SHALL BE MARKED PRIOR TO SHIPPING. THE MARKS SHALL INCLUDE THE BEARING LOCATION ON THE BRIDGE AND A DIRECTION ARROW THAT POINTS UP-STATION. ALL MARKS SHALL BE PERMANENT AND SHALL BE VISIBLE AFTER THE BEARING IS INSTALLED.
6. BASIS OF PAYMENT: THE UNIT BID PRICE SHALL INCLUDE ALL MATERIALS, LABOR, AND INCIDENTALS NECESSARY TO FURNISH AND INSTALL LAMINATED ELASTOMERIC BEARINGS, INCLUDING LOAD PLATES AND MISC. HARDWARE. PAYMENT WILL BE AT THE UNIT PRICE BID FOR ITEM 516, EACH, ELASTOMERIC BEARING WITH INTERNAL LAMINATES AND STEEL LOAD PLATE, AS PER PLAN.
7. ANCHOR RODS SHALL BE ASTM F1554, GRADE 105. NUTS SHALL CONFORM TO ASTM A563 FOR APPROPRIATE GRADE AND SIZE OF ANCHOR BOLT. WASHERS SHALL CONFORM TO ASTM F436.
8. INSTALL LOWER NUT IN CONTACT WITH TOP PLATE AND THEN BACK OFF ½ TURN. INSTALL UPPER NUT SNUG TIGHT TO PREVENT LOWER NUTS FROM LOOSENING.

LAMINATED ELASTOMERIC BEARING DETAILS (INTERIOR AND EXTERIOR BEARINGS ARE THE SAME)

SUBSTRUCTURE UNIT	TYPE	BEARING DIMENSIONS, SEE DETAIL 1 (INCHES)								BEVELED PLATE (INCHES)				SERVICE REACTIONS (KIP)		
		L	W	Te	Ti	N	n	T	H	Ls	Ws	Ts	%	DL	LL (MAX.)	DESIGN
REAR ABUTMENT	EXP.	11	11	0.35	0.5	3	3	2.07	3.57	12	12	1.5	2.88%	43.03	22.35	65.38
PIER 1	FIX.	13.5	15	0.35	0.5	4	4	2.65	4.15	14.5	24.75	1.5	2.88%	127.72	29.72	157.44
PIER 2	EXP.	13.5	15	0.35	0.5	4	4	2.65	4.15	14.5	16	1.5	-3.67%	120.93	28.67	149.60
FORWARD ABUTMENT	EXP.	11	11	0.35	0.5	5	5	3.22	4.72	12	12	1.5	-4.62%	39.53	22.22	61.75

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED	DRAWN	REVIEWED	DATE
JBM	MAK	MUR	09/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH	JBM	TBD	

RECORD PLANS

BEARING DETAILS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

31 / 37
33
39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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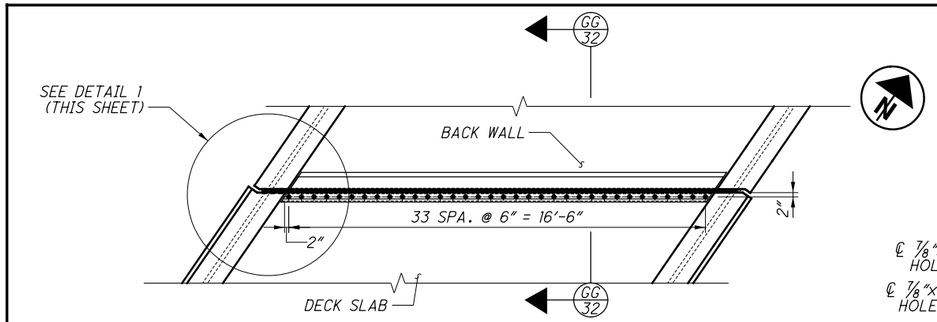
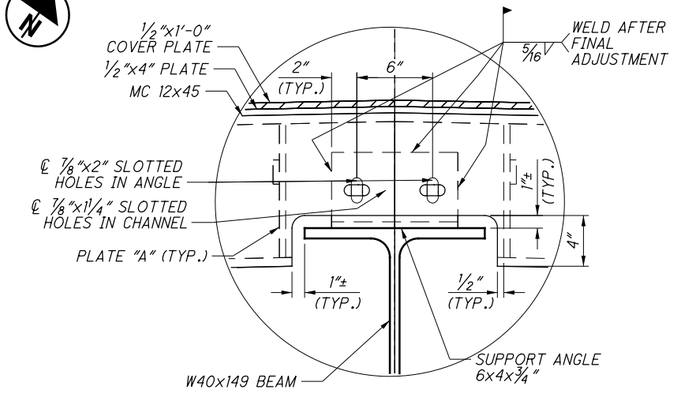
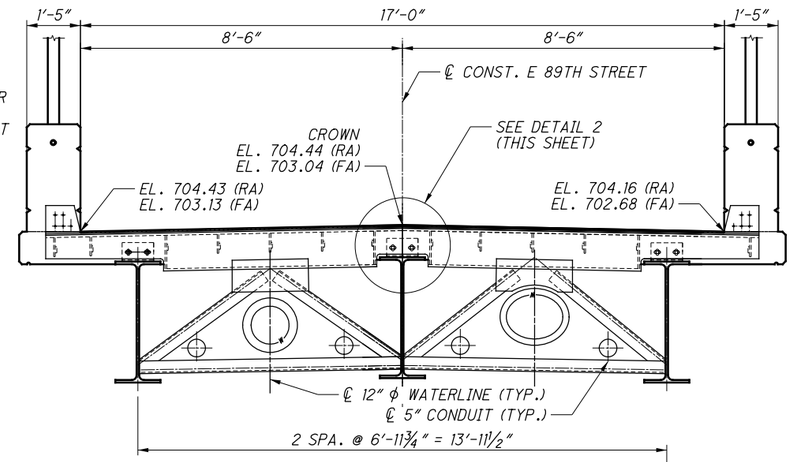


PLAN AT REAR ABUTMENT

(FORWARD ABUTMENT SIMILAR)

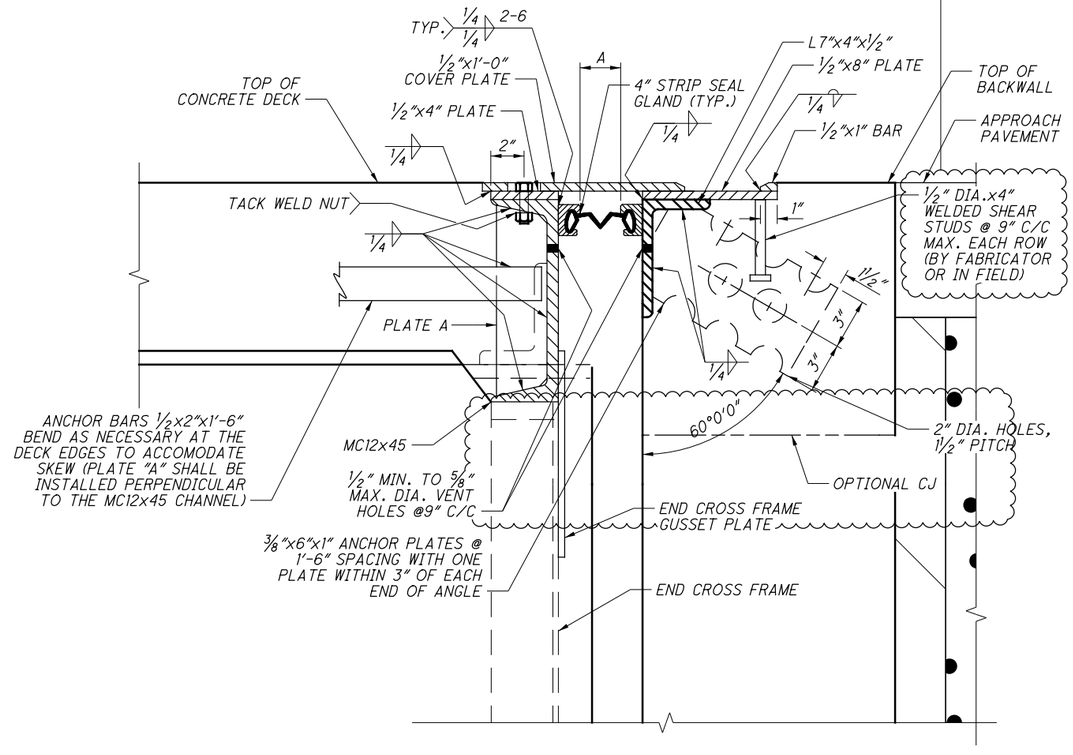


DETAIL 2



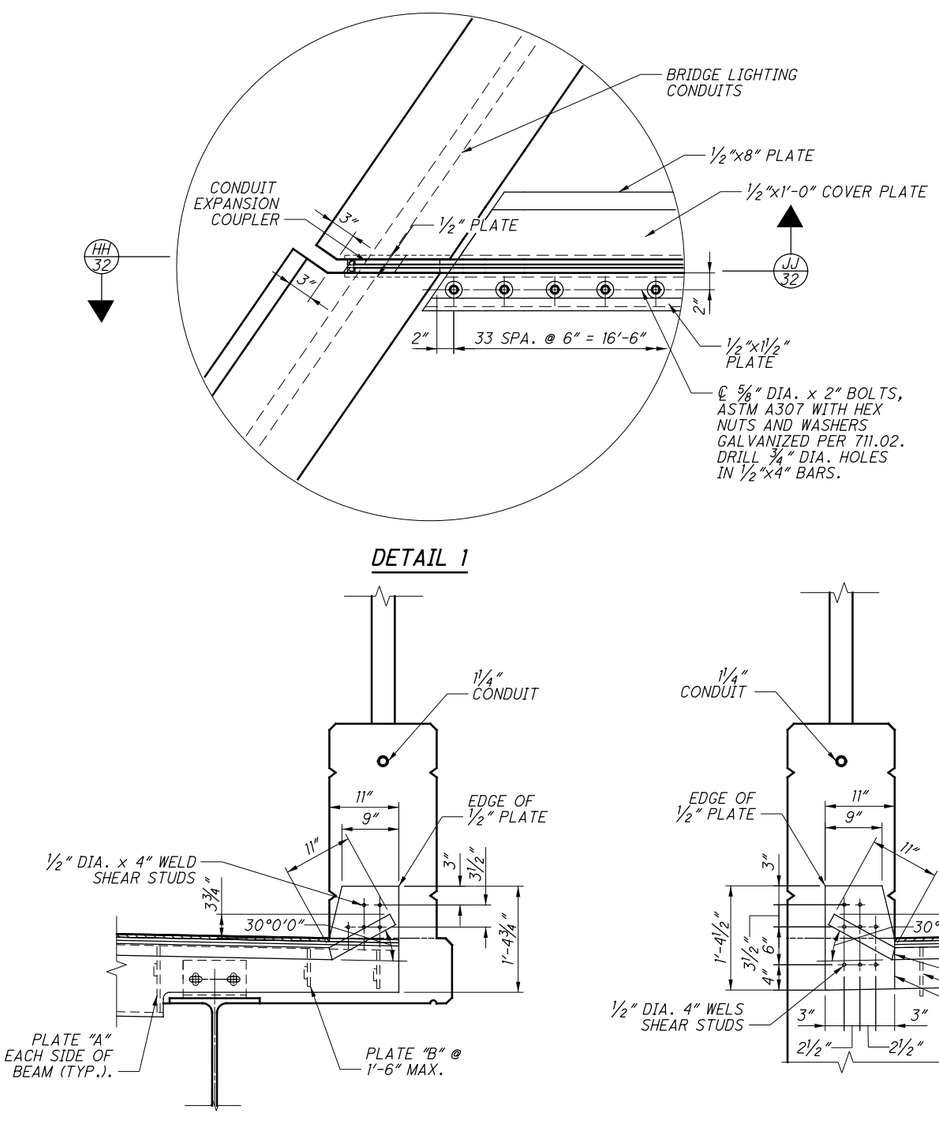
REAR ABUTMENT SECTION

(FORWARD ABUTMENT SIMILAR, OPPOSITE HAND)
(DIMENSIONS ALONG FACE OF BACKWALL ALONG THE SKEW)



EXPANSION JOINT DETAIL

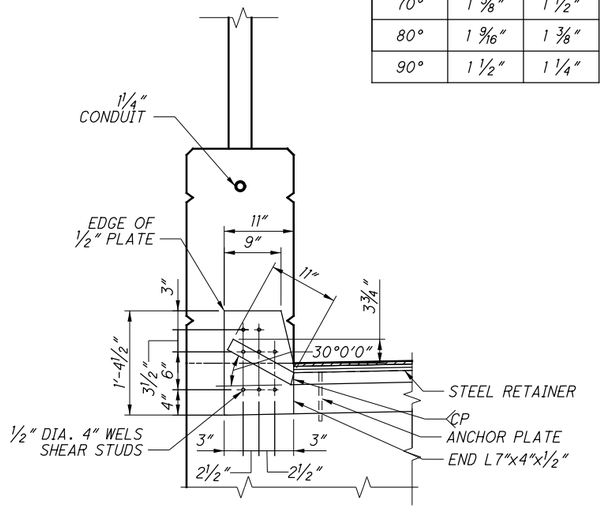
REAR ABUTMENT SHOWN (FORWARD SIMILAR)



DIMENSION "A"		
TEMP.	RA	FA
30°	1 13/16"	1 15/16"
40°	1 ¾"	1 13/16"
50°	1 ¾"	1 11/16"
60°	1 11/16"	1 9/16"
70°	1 ⅝"	1 ½"
80°	1 9/16"	1 ⅜"
90°	1 ½"	1 ¼"

DETAIL 1

HH 32 SECTION



JJ 32 SECTION

NOTES:

1. SEE STANDARD DRAWING EXJ-4-87 FOR ADDITIONAL NOTES AND DETAILS

GG 32 SECTION

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

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2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

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CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

EXPANSION JOINT DETAILS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

32 / 37
34
39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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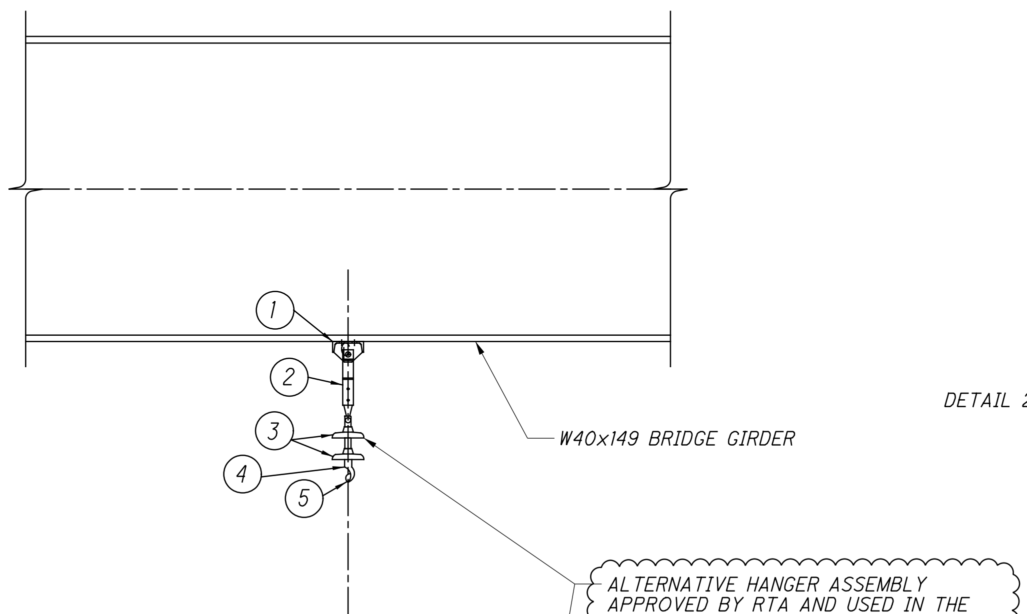
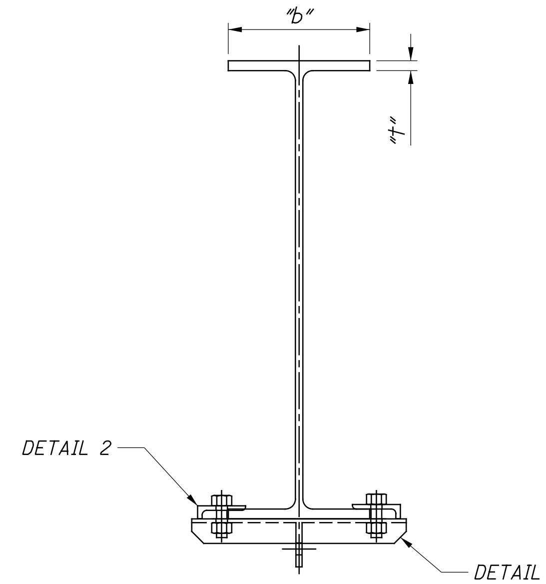


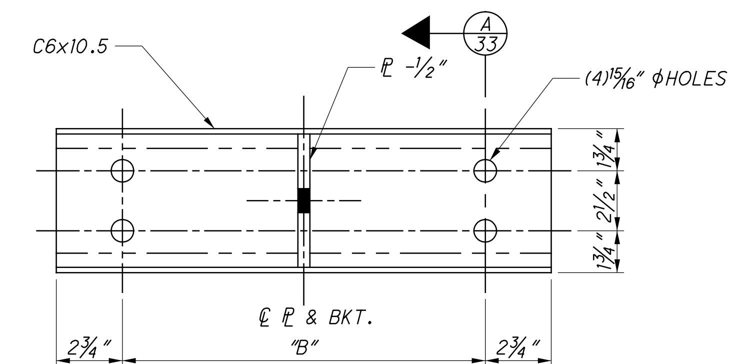
BSC-1
BEAM SLIDING CONNECTION
(2 REQUIRED - B1 & B3)

BEAM SLIDING CONNECITON			
ITEM	DESCRIPTION	PART NO.	QTY.
1	BEAM SLIDING CONNECTION, BSC-1	-	1
2	O.B. TWISTED LINK, FIGURE 8	79668	1
3	O.B. SUSPENSION INSULATOR, CLEVIS TYPE HIGH IMPACT (5000# WORKING LOAD)	47033	2
4	O.B. MESSENGER SUSPENSION CLAMP	83106	1
5	MESSENGER CABLE	-	-

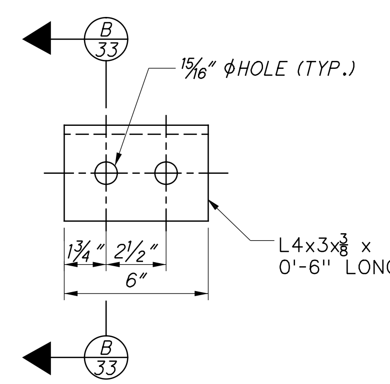


DETAIL BSC-1
(BEAM SLIDING CONNECTION)
SCALE: 1½"=1'-0"

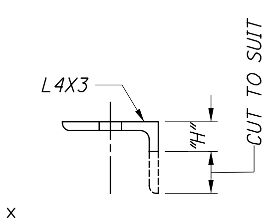
BSC-1 DIMENSION SCHEDULE				
BEAM SIZE	"b"	"B"	"t"	"H"
W40X149	11¾"	1'-0⅞"	13/16"	1 3/16"



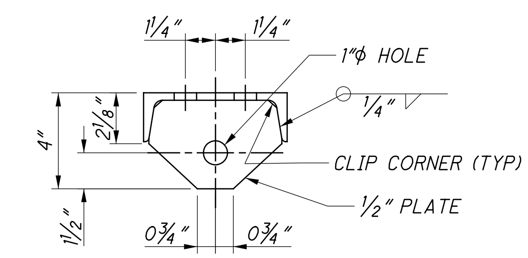
DETAIL 1
SCALE: 3"=1'-0"



DETAIL 2
SCALE: 3"=1'-0"



B/33 SECTION
SCALE: 3"=1'-0"



A/33 SECTION
SCALE: 3"=1'-0"
CONNECTION PLATE

NOTE:

1. REFER TO SHEET 19 / 37 FOR SIGNAL WIRE CONNECTION STATION AND OFFSET.

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

SIGNAL WIRE CONNECTION
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

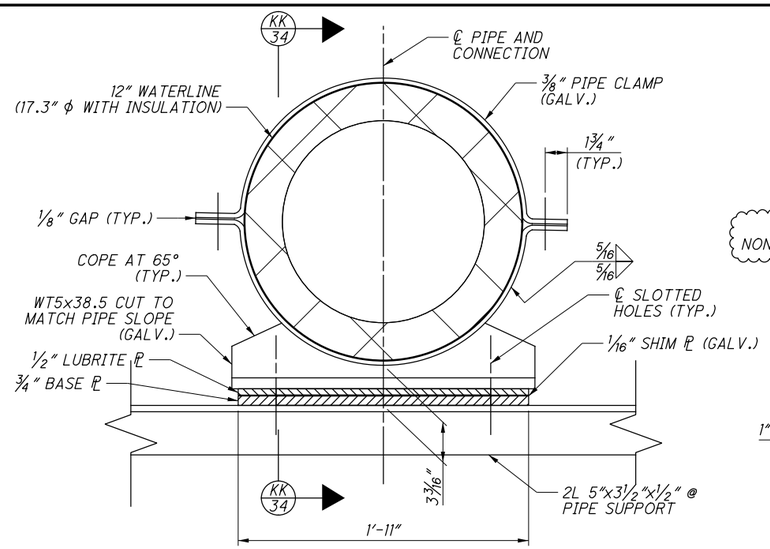
DESIGN AGENCY: meliora — Civil, Water Resources, and Structural Engineering

DESIGNED LWH | CHECKED JWA | DRAWN LWH | REVISED | REVIEWED CDC | DATE 07/01/19 | STRUCTURE FILE NUMBER TBD

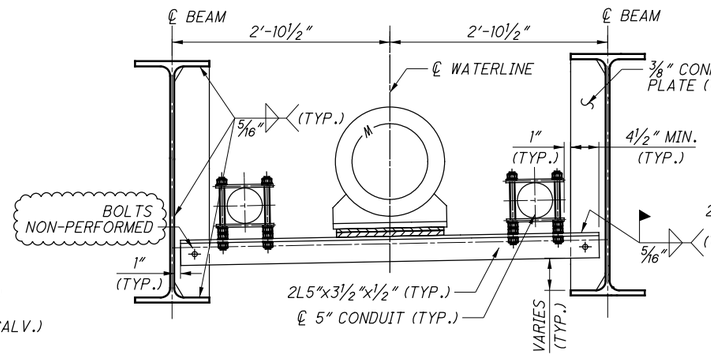
CUY-IR490/SR010-2.09/19.28
PID No. 96833

RECORD PLANS

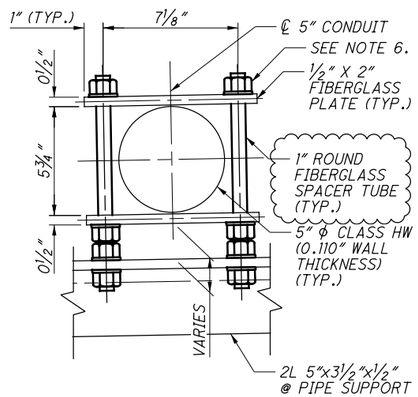
BU-25 - E 89TH ST PEDESTRIAN BRIDGE
...\Sheets\4015_SM702.dgn 1/7/2025 9:29:04 AM Gregory.Hertler



12" WATERLINE (18" ϕ WITH INSULATION)

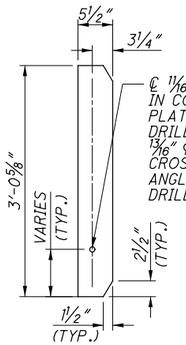


WATERLINE SUPPORT

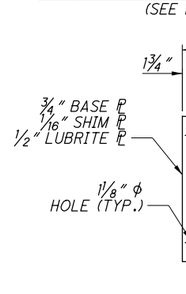


5" ϕ CPP ELECTRIC DUCT

(SEE NOTE 7)

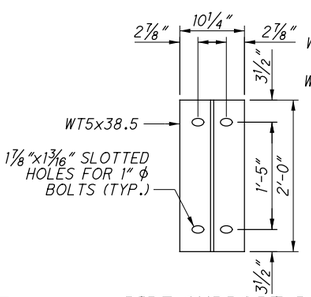


CONNECTION PLATE



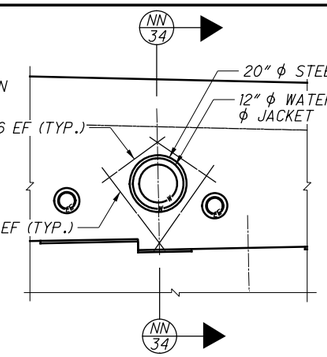
BASE PLATE, LUBRITE PLATE AND SHIM PLATE

(12" WATERLINE)

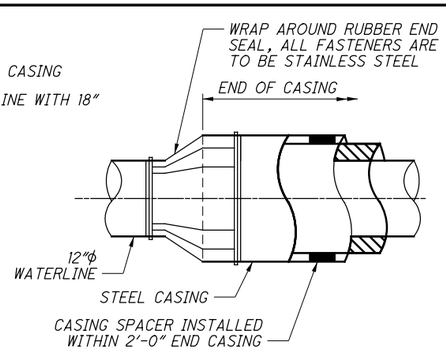


PIPE SUPPORT BASE

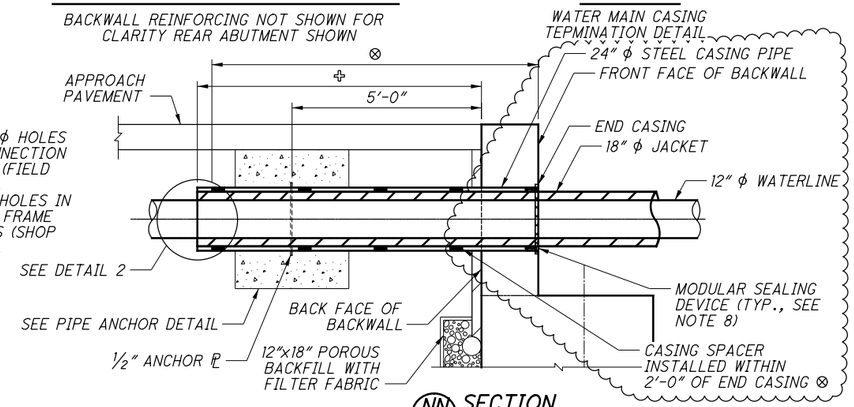
(12" WATERLINE)



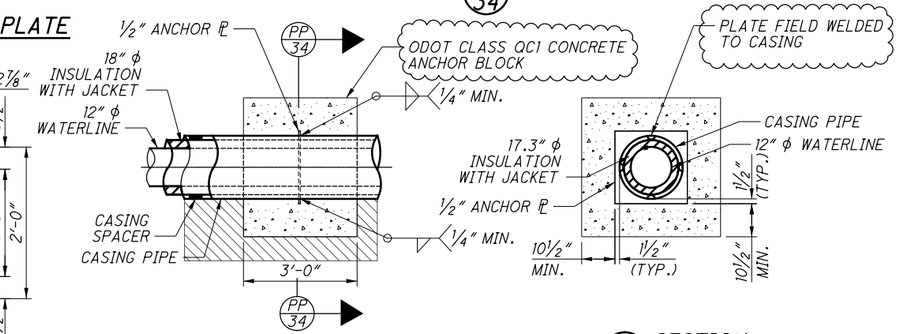
PARTIAL ABUTMENT ELEVATION



DETAIL 2



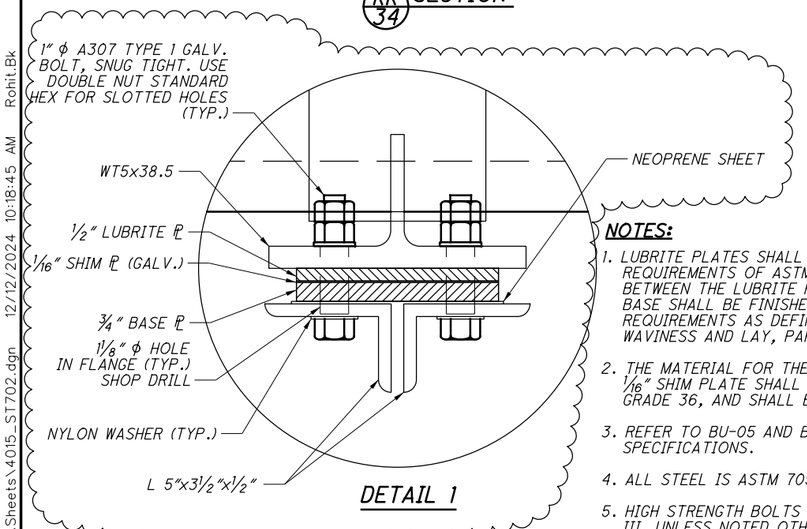
NN 34 SECTION



TYPICAL PIPE ANCHOR DETAIL ◪

PP 34 SECTION

KK 34 SECTION



DETAIL 1

NOTES:

1. LUBRITE PLATES SHALL BE 1/2" THICK #237 TYPE G1, MEETING THE REQUIREMENTS OF ASTM B22, ALLOY C91100. THE CONTACT SURFACE BETWEEN THE LUBRITE PLATE AND THE WT5x38.5 PIPE SUPPORT BASE SHALL BE FINISHED WITH 125 MICROMETER SURFACE ROUGHNESS REQUIREMENTS AS DEFINED IN ANSI B46.1. SURFACE ROUGHNESS WAVINESS AND LAY, PART 1.
2. THE MATERIAL FOR THE 3/8" PIPE CLAMP, PIPE SUPPORT BASE AND 1/16" SHIM PLATE SHALL MEET THE REQUIREMENTS OF ASTM A709, GRADE 36, AND SHALL BE GALVANIZED PER CMS 711.02.
3. REFER TO BU-05 AND BU-07 PLANS FOR PIPE INSULATION SPECIFICATIONS.
4. ALL STEEL IS ASTM 709, GRADE 50W, UNLESS NOTED OTHERWISE.
5. HIGH STRENGTH BOLTS SHALL BE 5/8" DIAMETER, ASTM A325, TYPE III, UNLESS NOTED OTHERWISE.
6. For 5" ϕCPP ELECTRIC DUCT, 3/4" DIA. HOT-DIPPED GALVANIZED THREADED ROD W/NUTS, 2" DIA. FLAT WASHERS AND LOCK WASHERS (TYP.) TIGHTEN WITHOUT CRUSHING OR DISTORTING THE SPACER TUBES. PLACE NYLON WASHER BETWEEN GALVANIZED STEEL WASHER AND WEATHERING STEEL SUPPORT. LENGTH OF ROD TO VARY TO ALLOW HEIGHT ADJUSTMENT IN THE FIELD.
7. DEFLECTION OF CONDUITS REQUIRED BETWEEN LAST INTERMEDIATE K-FRMAE AND END K-FRAME TO ALLOW CONDUITS TO ENTER BACKWALL. REFER TO BU-11 FOR 5" CONDUIT INFORMATION.
8. MODULAR SEALING DEVICE SHALL BE LINK-SEAL, INNERLYNX, OR APPROVED EQUAL. SIZE THE SEALING DEVICE AND SLEEVE BASED ON THE MANUFACTURER'S RECOMMENDATIONS. USE LOW DUROMETER SEALS FOR THE 12" WALERLINE
9. REFER TO SHEET 24 /39 FOR WATERLINE SUPPLEMENTAL SUPPORT DETAILS.
10. FOR 12" WATERLINE SUPPORT, SEPARATE GALVANIZED PLATE AND WEATHERING STEEL SUPPORT ANGLE WITH NEOPRENE PAD AND PLACE NYLON WASHER BETWEEN GALVANIZED NUTS AND WEATHERING STEEL COMPONENTS.
11. CUT NOTCHES IN ANOTHER BLOCK AS NEEDED TO PASS THROUGH CPP CONDUITS.

LEGEND:

Δ PIPE CLAMP BOLTS SHALL NOT BE TIGHTENED UNTIL AFTER DECK AND SIDEWALK CONCRETE HAS BEEN PLACED.

✣ AT REAR ABUTMENT UTLITY CASING SHALL EXTEND FROM BACK FACE OF BACKWALL TO 10'-0" BEYOND THE LIMITS OF THE MSE WALL GRANULAR BACKFILL.

◪ ANCHOR PLATES ARE 1/2" STEEL CENTERED ON WATERLINE WITH DIMENSIONS 1 1/2" LARGER HORIZONTAL AND 1 1/2" LARGER VERTICALLY THAN NOMINAL WATERLINE DIAMETER. CONCRETE ANCHOR BLOCK EXTENDS MINIMUM OF 10 1/2" OUTSIDE ANCHOR PLATE AND IS MINIMUM OF 36" IN LENGTH.

⊗ CASING SPACER SPA. @ 2'-0" THROUGH THE ENTIRE LENGTH OF CASING PIPE.

NO.	DATE	DESCRIPTION
1	2024-09-10	RECORD DRAWINGS
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED	DRAWN	REVIEWED	DATE
MAK	MAK	MUR	09/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

UTILITY DETAILS
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

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36 / 39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
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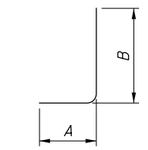
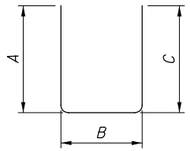
MARK	NUMBER REAR	NUMBER FORWARD	NUMBER TOTAL	LENGTH	WEIGHT (LBS)	TYPE	DIMENSIONS A	B	C	D	E	R	INC.
					ABUTMENTS								
A501	10		10	6′-5″	67	2	1′-7″	3′-6″	1′-7″				
A502	20	20	40	7′-11″	330	1	2′-7″	5′-5″					
A503	4		4	15′-3″	64	3	4′-10″	2′-6″					
A504	20	20	40	11′-6″	480	3	3′-0″	2′-6″					
A505		4	4	15′-9″	66	3	5′-1″	2′-6″					
A506		10	10	6′-11″	72	2	1′-7″	4′-0″	1′-7″				
A601	6	12	18	19′-6″	527	STR.							
A602	9	9	18	8′-7″	232	2	4′-0″	0′-11″	4′-0″				
A603	15		15	10′-0″	225	2	4′-0″	3′-10″	2′-6″				
A604	38	38	76	3′-7″	409	STR.							
A605	19		19	13′-10″	395	2	6′-6″	1′-2″	6′-6″				
A606		15	15	15′-1″	340	2	9′-1″	3′-10″	2′-6″				
A607	16	16	32	9′-4″	449	STR.							
A608	1	7	8	18′-7″	223	STR.							
A609	8	28	36	12′-4″	667	STR.							
A610	34	34	68	5′-10″	596	16	5′-2″						
A611	5	5	10	11′-1″	166	STR.							
A612	2	2	4	4′-6″	27	2	1′-5″	2′-0″	1′-5″				
	1	1	2	7′-11″			1′-2″						
A613	SER. OF	SER. OF	SER. OF	TO	98	3	TO	2′-6″					1′-5″
	3	3	3	13′-9″			4′-1″						
A614	8	8	16	5′-2″	124	STR.							
A615	4	4	8	5′-0″	60	STR.							
A616		19	19	24′-0″	685	2	11′-7″	1′-2″	11′-7″				
A617	9	15	24	8′-1″	291	13	3′-10″	0′-4″	0′-4″	3′-10″			
A618	15	15	30	5′-10″	263	2	1′-2″	3′-10″	1′-2″				
A619	18	18	36	5′-11″	320	2	1′-5″	3′-5″	1′-5″				
A620	22		22	4′-0″	132	STR.							
A621		22	22	9′-1″	300	STR.							
A622	8	8	16	8′-9″	210	2	4′-0″	1′-1″	4′-0″				
A623	5	5	10	8′-8″	130	19	4′-10″	3′-2″	2′-2″				
	1	1	2	12′-2″									
A624	SER. OF	SER. OF	SER. OF	TO	157	STR.							7″
	4	4	4	13′-11″									
A625	1	1	2	13′-8″	41	STR.							
A626	5	5	10	8′-6″	128	11	2′-2″	3′-2″	4′-10″				
A801	5	5	10	21′-9″	581	STR.							
A802	8		8	15′-11″	340	STR.							
A803	2	2	4	12′-3″	131	STR.							
A804	4		4	13′-6″	144	STR.							
A805	8	8	16	3′-10″	164	STR.							
A806	8	8	16	2′-2″	93	STR.							
A807	2	2	4	21′-0″	224	STR.							
A808		8	8	16′-7″	354	STR.							
A809		2	2	12′-10″	69	STR.							
A810	2	4	6	13′-11″	223	STR.							
DS1002	32		32	27′-5″	3775	16	26′-0″						
DS1101		48	48	20′-10″	5313	16	19′-3″						
SP402	4		4	339′-6″	907	27	0′-6″	2′-0″	26′-0″				
SP501		4	4	300′-8″	1254	27	0′-6 1/2″	2′-6″	19′-6″				
SP502		4	4	123′-4″	515	27	0′-6 1/2″	2′-6″	7′-3″				
			SUBTOTAL ABUTMENTS =		22361								
			TOTAL CARRIED TO SHEET 34/35 =		22361								

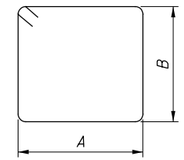
BEND DIAGRAMS



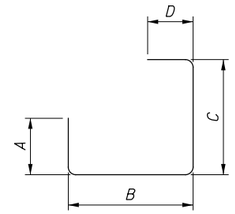
TYPE-1



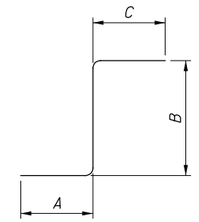
TYPE-2



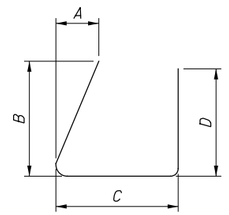
TYPE-3



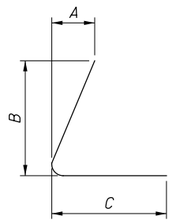
TYPE-7



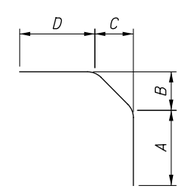
TYPE-8



TYPE-9



TYPE-11



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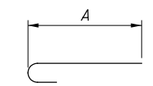

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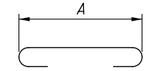
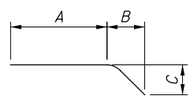
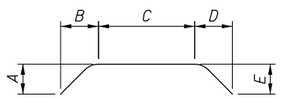


TYPE-17



TYPE-19



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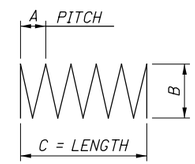

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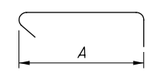

TYPE-41

NOTES:

1. THE BAR SIZE NUMBER IS SPECIFIED ON THE PLANS IN THE BAR MARK COLUMN. THE FIRST DIGIT WHERE 3 DIGITS ARE USED, AND THE FIRST 2 DIGITS WHERE FOUR DIGITS ARE USED, INDICATES THE BAR SIZE NUMBER. FOR EXAMPLE, W501 IS A NO. 5 BAR AND 01 INDICATES BAR SEQUENCE NUMBER. BAR DIMENSIONS SHOWN ARE OUT UNLESS OTHERWISE INDICATED.
2. ALL REINFORCING STEEL TO BE EPOXY COATED.
3. FOR ABBREVIATIONS LEGEND, SEE SHEET 5/37.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DATE 09/23/19
REVIEWED MUR
STRUCTURE FILE NUMBER TBD
DRAWN JBM
REVISED
DESIGNED JBM
CHECKED JAH

RECORD PLANS

REINFORCING STEEL LIST
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
..\Sheets\4015_SL701.dgn 11/19/2019 6:28:35 AM Julia_Hart

MARK	NUMBER REAR	NUMBER FORWARD	NUMBER TOTAL	LENGTH	WEIGHT (LBS)	TYPE	DIMENSIONS A	B	C	D	E	R	INC.
SUPERSTRUCTURE													
S401			185	30′-0″	3708	STR.							
S402			17	9′-0″	103	STR.							
S403			16	21′-7″	231	STR.							
S404			16	17′-7″	188	STR.							
S501			171	30′-0″	5351	STR.							
S502			19	14′-4″	285	STR.							
S503			490	17′-6″	8944	17	16′-4″						
			2	3′-10″			3′-3″						
S504			SER. OF	TO	965	16	TO						0′-8 3/4″
			18	16′-3″			15′-7 3/4″						
S505			16	3′-4″	56	STR.							
S506			8	19′-11″	167	STR.							
S507			502	7′-11″	4146	16	7′-4″						
			2	3′-7″			3′-0″						
S508			SER. OF	TO	81	16							2′-10″
			3	6′-5″			5′-10″						
			2	3′-3″									
S509			SER. OF	TO	910	STR.							0′-8 3/4″
			18	15′-8″									
S510			16	4′-9″	80	STR.							
S511			490	16′-4″	8348	STR.							
SUBTOTAL SUPERSTRUCTURE =					33563								

MARK	NUMBER PIER 1	NUMBER PIER 2	NUMBER TOTAL	LENGTH	WEIGHT (LBS)	TYPE	DIMENSIONS A	B	C	D	E	R	INC.
PIERS													
P301	62	62	124	3′-7″	168	41	2′-6″						
P501	6	6	12	17′-8″	222	STR.							
P502	2	2	4	14′-7″	61	STR.							
P503	23	23	46	28′-7″	1372	3	11′-6″	2′-6″					
P504	31	19	54	9′-9″	550	2	3′-8″	2′-8″	3′-8″				
P505	13	13	26	11′-11″	324	2	4′-9″	2′-8″	4′-9″				
	2	2	4	9′-9″			3′-8″		3′-8″				
P506			SER. OF	TO	534	2	TO	2′-8″	TO				0′-7″
	3	3	3	10′-11″			4′-3″		4′-3″				
P801	4	4	8	20′-5″	437	2	1′-7″	17′-8″	1′-7″				
P802	3	3	6	15′-0″	241	STR.							
P803	4	4	8	19′-3″	412	20	2′-0″	3′-1″	11′-11″	3′-1″	2′-0″		
P1001	38	38	76	24′-3″	7931	STR.							
DS1001	16	16	32	15′-3″	2100	STR.							
SP401	2	2	4	132′-4″	354	27	0′-6″	2′-0″	9′-0″				
SUBTOTAL PIERS =					14706								
SHEET TOTAL =					48269								
TOTAL CARRIED FROM SHEET 33/35 =					22361								
TOTAL CARRIED TO SHEET 35/35 =					70630								

NOTES:

1. THE BAR SIZE NUMBER IS SPECIFIED ON THE PLANS IN THE BAR MARK COLUMN. THE FIRST DIGIT WHERE 3 DIGITS ARE USED, AND THE FIRST 2 DIGITS WHERE FOUR DIGITS ARE USED, INDICATES THE BAR SIZE NUMBER. FOR EXAMPLE, W501 IS A NO. 5 BAR AND 01 INDICATES BAR SEQUENCE NUMBER. BAR DIMENSIONS SHOWN ARE OUT UNLESS OTHERWISE INDICATED.
2. ALL REINFORCING STEEL TO BE EPOXY COATED.
3. FOR ABBREVIATIONS LEGEND, SEE SHEET 5/37.
4. FOR BEND DIAGRAMS, SEE SHEET 35/37.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
2LMN Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED	DRAWN	REVIEWED	DATE
MAK	MAK	MUR	07/23/19
CHECKED	REVISED	STRUCTURE FILE NUMBER	
JAH		TBD	

RECORD PLANS

REINFORCING STEEL LIST
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

36/37

38/39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
..\Sheets\4015_SL702.dgn 11/19/2019 6:28:53 AM Julio_Hart

	MARK	NUMBER REAR	NUMBER FORWARD	NUMBER TOTAL	LENGTH	WEIGHT (LBS)	TYPE	DIMENSIONS A	B	C	D	E	R	INC.
	WALLS													
	W401			4	5'-2"	14	STR.							
	W402			10	5'-0"	34	STR.							
	W403			14	3'-9"	36	STR.							
	W404			10	9'-3"	62	STR.							
*	W501			4	6'-5"	27	STR.							
*	W502			10	6'-2"	65	STR.							
	W503			90	2'-4"	220	1	1'-1"	1'-4"					
				1	1'-2"									
	W504			SER. OF	TO	145	STR.							2 1/8"
				34	7'-0"									
					SUBTOTAL WALLS =	603								

	MARK	NUMBER REAR	NUMBER FORWARD	NUMBER TOTAL	LENGTH	WEIGHT (LBS)	TYPE	DIMENSIONS A	B	C	D	E	R	INC.
	RAILINGS													
	R501			72	30'-0"	2253	STR.							
	R502			8	7'-7"	64	STR.							
	R503			112	9'-8"	1130	STR.							
	R504			152	4'-8"	740	STR.							
	R505			6	6'-3"	40	STR.							
	R506			2	6'-11"	15	STR.							
	R507			2	11'-11"	25	STR.							
	R508			1168	3'-4"	4061	1	0'-9"	2'-8"					
	R509			584	4'-6"	2742	1	1'-6"	3'-1"					
	R510			584	4'-8"	2843	1	1'-6"	3'-3"					
	R511			2	11'-8"	25	STR.							
	R512			2	12'-3"	26	STR.							
	R513			4	3'-9"	16	STR.							
	R514			4	3'-1"	13	STR.							
	R515			4	10'-2"	43	STR.							
	R516			8	9'-7"	80	STR.							
	R517			4	9'-5"	40	STR.							
	R518			4	10'-0"	42	STR.							
	R519			94	5'-11"	581	1	0'-9"	5'-3"					
	R520			4	10'-3"	43	STR.							
	R521			4	10'-5"	44	STR.							
	R522			4	9'-10"	42	STR.							
	R523			2	12'-6"	27	STR.							
					SUBTOTAL RAILINGS =	14935								

	MARK	NUMBER REAR	NUMBER FORWARD	NUMBER TOTAL	LENGTH	WEIGHT (LBS)	TYPE	DIMENSIONS A	B	C	D	E	R	INC.
	PYLONS													
	R401			40	3'-0"	81	STR.							
	R402			120	3'-8"	294	STR.							
	R403			32	1'-5"	31	1	0'-9"	0'-9"					
	R404			32	3'-1"	66	8	0'-10 1/2"	0'-4"	2'-0"				
	R405			88	5'-2"	304	7	0'-4"	0'-9"	3'-8"	0'-8"			
	R406			512	4'-6"	1540	2	0'-6"	3'-8"	0'-6"				
	R407			44	1'-11"	57	7	0'-4"	0'-9"	0'-9"	0'-4"			
	R408			176	10'-2"	1196	STR.							
	R409			8	7'-8"	41	STR.							
	R410			8	7'-11"	43	STR.							
	R411			8	13'-0"	70	STR.							
	R412			8	12'-6"	67	STR.							
	R413			40	8'-8"	232	STR.							
	R414			40	9'-0"	241	STR.							
	R415			40	14'-0"	375	STR.							
	R416			40	13'-6"	361	STR.							
					SUBTOTAL PYLONS =	4999								
					SHEET TOTAL =	20537								
					TOTAL CARRIED FROM SHEET 34/35 =	70630								
					TOTAL =	91167								

* - DOWEL BAR

NOTES:

1. THE BAR SIZE NUMBER IS SPECIFIED ON THE PLANS IN THE BAR MARK COLUMN. THE FIRST DIGIT WHERE 3 DIGITS ARE USED, AND THE FIRST 2 DIGITS WHERE FOUR DIGITS ARE USED, INDICATES THE BAR SIZE NUMBER. FOR EXAMPLE, W501 IS A NO. 5 BAR AND 01 INDICATES BAR SEQUENCE NUMBER. BAR DIMENSIONS SHOWN ARE OUT UNLESS OTHERWISE INDICATED.
2. ALL REINFORCING STEEL TO BE EPOXY COATED.
3. FOR ABBREVIATIONS LEGEND, SEE SHEET 5/37.
4. FOR BEND DIAGRAMS, SEE SHEET 35/37.

NO.	DATE	DESCRIPTION
0	2019-09-30	RFC

ISSUE RECORD

DESIGN AGENCY
DLZ Ohio Inc.
2475 Sugar Grove Rd., SE Lancaster, Ohio 43130
(740) 687-5542 Phone - (740) 687-0086 Fax

DESIGNED JBM | DRAWN MAK | CHECKED JAH | REVIEWED MUR | DATE 09/23/19 | STRUCTURE FILE NUMBER TBD | REVISED

RECORD PLANS

REINFORCING STEEL LIST
CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

RECORD PLANS

CUY-IR490/SR010-2.09/19.28
PID No. 96833

37/37

39/39

BU-25 - E 89TH ST PEDESTRIAN BRIDGE
..\Sheets\4015_SL703.dgn 11/19/2019 6:29:12 AM Julia_Hart

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166
www.reinforcedearth.com

DESIGN SUBMITTAL FOR
CUY-IR490/SR010-2.09/19.28

SHEET INDEX	
SHEET NO.	DRAWING NAME
1	COVER SHEET
2	GENERAL NOTES
3	MSE PLAN & ELEVATION VIEW
3A	STRIP SKEW PLAN VIEW
4–5	TYPICAL MSE SECTION(S) & DETAILS
6	STANDARD PANEL DETAILS
6A	ANGLE DETAILS

REAR ABUTMENT MSE WALL AT EAST 89TH ST.

3	12/23/20	REVISED PER ODOT COMMENT
2	10/15/20	REVISED PER ODOT COMMENT
1	6/4/20	REVISED PER 2LMN COMMENT

The design contained on these drawings is based on information provided by the Owner. On the basis of this information, The Reinforced Earth Company has designed, and is responsible for the internal stability of the structure only. External stability, including foundation (bearing capacity and settlement) and global stability (including sliding and rotation), is the responsibility of the Owner.

CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83108
REGISTERED
PROFESSIONAL ENGINEER
12/23/20

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166
"REINFORCED EARTH®" AND THE REINFORCED EARTH LOGO ARE REGISTERED TRADEMARKS OF THE REINFORCED EARTH COMPANY.

DESIGNED: MS | DRAWN: MS | REVIEWED: CA | DATE: 04/27/2020
CHECKED: CA | REVISED: | PID No: 96833

COVER SHEET
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

01 OF 6

18631

R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Dwg\(2020-04-27) 18631 R. Abut. At E. 89th St. MSE Wall Design.dwg

GENERAL NOTES:

DESIGN CRITERIA:

1. DESIGN IS BASED ON THE PARAMETERS BELOW, AND THE ASSUMPTION THAT THE FOUNDATION AND BACKFILL MATERIALS, METHODS OF CONSTRUCTION AND MATERIALS INSTALLED SHALL CONFORM TO THE APPLICABLE PROJECT TECHNICAL SPECIFICATIONS FOR M.S.E. WALLS.

2. CONTRACT DOCUMENT REFERENCE:
   THE M.S.E. WALLS SHOWN IN THESE PLANS WERE DESIGNED AND DETAILED PER INFORMATION REFERENCED IN THE FOLLOWING CONTRACT DOCUMENTS:
   - CONTRACT PLANS: RFC PLANS DATED 09/30/2019, SHT's 1 TO 39
   - AASHTO SPECIFICATIONS: LRFD BRIDGE DESIGN SPECIFICATIONS, 7TH EDITION, (INCLUDING 2015 INTERIMS)
   - DOT SPECIFIED DOCUMENTS: ODOT BRIDGE DESIGN MANUAL, 2007.
   - SS840 DATED 4/15/2016

3. SOIL DESIGN PARAMETERS: (TO BE VERIFIED BY GEOTECHNICAL ENGINEER OF RECORD)

   SELECT GRANULAR BACKFILL (REINFORCED SOIL ZONE):
   Φ = 34 degrees (MINIMUM), c = 0 p.s.f., γ = 120 p.c.f.

   RETAINED BACKFILL (COMPACTED EMBANKMENT FILL / IN SITU MATERIAL BEYOND SOIL REINFORCEMENT LIMITS):
   Φ = 30 degrees, c = 0 p.s.f., γ = 120 p.c.f.

   FOUNDATION MATERIAL:
   Φ = 30 degrees, c = 0 p.s.f.

   IF THE TESTED UNIT WEIGHT (γ) FOR THE SELECT MATERIAL VARIES (+ OR −) BY MORE THAN 10% FROM THE VALUE INDICATED ABOVE, THE CONTRACTOR SHALL CONTACT RECo AND THE GEOTECHNICAL ENGINEER OF RECORD TO ASSESS ANY POTENTIAL CHANGES TO THE MSE WALL DESIGN.

   IF THE SHEAR STRENGTH (Φ), Cohesion (c) or COEFFICIENT OF SLIDING (μ) FOR THE FOUNDATION MATERIAL IS LESS THAN THE VALUES INDICATED ABOVE, THE CONTRACTOR SHALL CONTACT THE GEOTECHNICAL ENGINEER OF RECORD TO DETERMINE IF FOUNDATION IMPROVEMENT IS REQUIRED, AND CONTACT RECo TO ASSESS ANY POTENTIAL CHANGES TO THE MSE WALL DESIGN.

   IF THE TESTED UNIT WEIGHT (γ) FOR THE RETAINED MATERIAL IS HEAVIER BY MORE THAN 10% FROM THE VALUE INDICATED ABOVE, THE CONTRACTOR SHALL CONTACT RECo AND THE GEOTECHNICAL ENGINEER TO ASSESS ANY POTENTIAL CHANGES TO THE MSE WALL DESIGN. IF THE SHEAR STRENGTH (Φ) FOR THE RETAINED MATERIAL IS LESS THAN THE VALUE INDICATED ABOVE, THE CONTRACTOR SHALL CONTACT RECo AND THE GEOTECHNICAL ENGINEER OF RECORD TO ASSESS ANY POTENTIAL CHANGES TO THE MSE WALL DESIGN.

4. DESIGN VEHICULAR SURCHARGE LOADING (IN ACCORDANCE WITH PROJECT SPECIFICATIONS)
   HS−20/HL−93 TRUCK = 250 PSF EQUIVALENT DESIGN SURCHARGE

   NOTE: THE DESIGN DOES NOT INCLUDE HEAVY TRUCK, EXCAVATOR OR CRANE LOADS (EQUIPMENT WITH A GROSS OPERATING WEIGHT GREATER THAN 72,000 LBS). COMPACTION EQUIPMENT SHALL BE SIZED BY THE CONTRACTOR WITH CONSIDERATION OF NECESSARY OFFSETS TO WALL FACING, BACKFILL TYPE AND LIFT THICKNESS (TYPICAL ROLLER STATIC WEIGHT: 8 TO 15 TON − DEPENDING ON APPLICATION). CONTRACTOR TO COORDINATE ANY HEAVY EQUIPMENT LOADING WITH RECo PRIOR TO FABRICATION OF WALL MATERIALS. ALL COSTS DUE TO LOADING IN EXCESS OF SPECIFICATIONS SHALL BE BORNE BY CONTRACTOR.

DESIGN LIFE: THE M.S.E. WALL HAS BEEN DESIGNED FOR A 100 YEAR SERVICE LIFE IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

FOUNDATION PREPARATION:

5. THE CALCULATED MAXIMUM APPLIED BEARING PRESSURE AT THE FOUNDATION LEVEL IS SHOWN ON THE WALL ELEVATIONS FOR EACH DESIGN CASE. IT IS THE RESPONSIBILITY OF THE GEOTECH TO DETERMINE IF THE FOUNDATION SOILS HAVE ADEQUATE STRENGTH TO RESIST THE APPLIED DESIGNED BEARING PRESSURES.

   M.S.E. WALL SUB−GRADE (ENTIRE FOOTPRINT = 2.0' IN FRONT OF WALL ALIGNMENT TO 2.0' BEYOND THE END OF THE DESIGNED LENGTH OF SOIL REINFORCEMENT AND ALONG THE ENTIRE LENGTH), SHOULD BE PROOF ROLLED WITH A HEAVY ROLLER, OR OTHERWISE EVALUATED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECH. ANY UNSUITABLE FOUNDATION MATERIAL BELOW THE REINFORCED EARTH VOLUME, AS DETERMINED BY THE GEOTECH, SHALL BE EXCAVATED AND REPLACED WITH SUITABLE MATERIAL (PLACED IN CONTROLLED, COMPACTED LIFTS) OR OTHERWISE STABILIZED AS DIRECTED BY THE GEOTECH.

SOIL REINFORCEMENT NOTES:

6. SOIL REINFORCEMENT MAY BE ONE OR MORE OF THE FOLLOWING AS DESIGNED AND SUPPLIED BY RECo.
   - HIGH ADHERENCE "HA" STEEL STRIPS SHALL BE RIBBED, 50mm WIDE BY 4mm THICK AND COMPLY WITH THE FOLLOWING SPECIFIED REQUIREMENTS DEFINED WITHIN ASTM A6/A6M−07 "GENERAL REQUIREMENTS", AND ASTM A572/A572M, GRADE 65, TYPE 1, 2, OR 3.
   - HA STEEL STRIPS SHALL BE HOT−DIP GALVANIZED AFTER FABRICATION HAS BEEN COMPLETED. GALVANIZATION SHALL CONFORM TO THE MINIMUM REQUIREMENTS DEFINED WITHIN ASTM A123/A123M, SECTION 6.1, TABLE 2, COATING GRADE 85. (2 oz/sf).

WALL CONSTRUCTION:

7. FOR GENERAL INFORMATION PERTAINING TO WALL CONSTRUCTION PLEASE REFER TO THE "CONSTRUCTION AND QUALITY CONTROL PROCEDURE MANUAL" FOR RECTANGULAR PANELS AVAILABLE ONLINE AT www.reinforcedearth.com

8. REINFORCED EARTH WALLS ALIGNED ALONG CURVES WILL FORM A SERIES OF SHORT CHORDS 9.84' EACH TO MATCH THE DESIRED WALL ALIGNMENT.

9. FOR LOCATION OF REINFORCED EARTH WALLS SEE CONTRACTS AND RECo PLAN VIEW (DRAWING 3 OF THESE PLANS).

10. BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN LIFTS (NO THICKER THAN 8" LOOSE LIFTS) AND IN ACCORDANCE WITH THE SPECIFICATIONS COVERING MSE WALLS, TO A LEVEL OF 2"(±) ABOVE THE LEVEL OF TIE STRIPS EMBEDDED AND PROTRUDING FROM THE REAR FACE OF THE PRECAST CONCRETE WALL FACING PANELS. INSTALLATION OF THE REINFORCING STRIPS SHALL BE PERMITTED ONLY AFTER PLACEMENT AND COMPACTION OF THE BACKFILL MATERIAL HAS REACHED THE REQUIRED LEVEL. WHERE THE PROJECT OR DEPARTMENT COMPACTION REQUIREMENTS ARE STRICTER (I.E. 98% DENSITY REQUIREMENT, 8" LOOSE LIFTS) THE STRICTER REQUIREMENT WILL BE USED.

11. M.S.E. SELECT BACKFILL SHALL BE COMPACTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, AS A MINIMUM: M.S.E. SELECT FILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR (ASTM D−698 OR AASHTO T−99, WITH OVERSIZE CORRECTION) AT A MOISTURE CONTENT 1% TO 2% BELOW OPTIMUM MOISTURE CONTENT. IF 30% OR MORE OF THE SELECT GRANULAR BACKFILL IS GREATER THAN ¾" IN SIZE, ASTM D−698/AASHTO T−99 IS NOT APPLICABLE. FOR SUCH A MATERIAL, THE ACCEPTANCE CRITERION FOR CONTROL OF COMPACTION SHALL BE EITHER A MINIMUM OF 70% OF THE RELATIVE DENSITY OF THE MATERIAL AS DETERMINED BY ASTM D−4253 AND D−4254, OR A METHOD SPECIFICATION, BASED ON A TEST COMPACTION SECTION WHICH DEFINES THE TYPE OF EQUIPMENT, LIFT THICKNESS NUMBER OF PASSES OF THE SPECIFIED EQUIPMENT, AND PLACEMENT MOISTURE CONTENT. WHERE THE DEPARTMENT'S COMPACTION REQUIREMENTS ARE MORE STRICT, THAT DEPARTMENT'S REQUIREMENTS SHALL BE USED IN GENERAL.

12. HEAVY COMPACTION AND OPERATION EQUIPMENT SHALL BE KEPT A MINIMUM DISTANCE OF 3'−0" FROM THE BACK FACE OF THE PRECAST CONCRETE WALL FACING PANELS. COMPACTION WITHIN THE 3'−0" ZONE SHALL BE ACHIEVED WITH AT LEAST SIX (6) PASSES OF A LIGHTWEIGHT MECHANICAL TAMPER, ROLLER OR VIBRATORY SYSTEM (LESS THAN 1,000 LBS.), SMALLER LIFTS MAY BE REQUIRED TO ACHIEVE ADEQUATE COMPACTION (GENERALLY REGARDED AS 90% STANDARD PROCTOR FOR THIS ZONE). COMPACTION DENSITY TESTS ARE NOT REQUIRED WITHIN SAID 3 FT. ZONE, EXCEPT WHERE REQUIRED BY PROJECT SPECIAL PROVISIONS AND IF STRUCTURAL FOOTINGS ARE TO BE PLACED ATOP THE MSE WALL WITHIN THE 3 FT ZONE.

13. THE FINISHED GRADE BACKFILL IN FRONT OF THE WALL SHALL BE PLACED AND COMPACTED AS SOON AS POSSIBLE (AS CONSTRUCTION SEQUENCE PERMITS TO ALLOW FOR BOTTOM PANELS TO MOVE TOWARDS A PLUMB POSITION) TO MITIGATE THE POTENTIAL FOR EROSION AND UNDERMINING OF THE CONCRETE LEVELING PAD. IN ANY EVENT, BACKFILL IN FRONT OF THE WALL SHALL BE PLACED AND COMPACTED BEFORE WALL CONSTRUCTION EXCEEDS A HEIGHT OF 20 FT. FINISHED GRADE BACKFILL SHALL BE PLACED IN LIFTS AND PROPERLY COMPACTED AS REQUIRED BY PROJECT SPECIFICATIONS.

14. FOR MANHOLES, DRAIN PIPES, DROP INLETS AND/OR OTHER UTILITIES LOCATED WITHIN THE MSE VOLUME, WHERE REINFORCING STRIPS ARE BLOCKED FROM BEING PLACED NORMALLY, REINFORCING STRIPS MAY BE SKEWED UP TO THE MAXIMUM OF 15° TO AVOID THE OBSTRUCTION. IF SPECIFIC DETAILS HAVE NOT BEEN INCLUDED ADDRESSING AN OBSTRUCTION, AND THE ANGLE OF THE NECESSARY SKEW TO CLEAR THE OBSTRUCTION IS GREATER THAN 15°, THE CONTRACTOR SHALL CONTACT RECo FOR APPROPRIATE DETAIL TO ACCOMMODATE THE OBSTRUCTION.

15. IF PILES ARE TO BE LOCATED WITHIN THE MSE VOLUME, THEY SHALL BE ALIGNED AND DRIVEN PRIOR TO THE CONSTRUCTION OF THE MSE STRUCTURE. UNLESS A METHOD TO PROTECT THE MSE STRUCTURE AND ALL NECESSARY ELEMENTS HAS BEEN DEVISED BY THE CONTRACTOR AND FOUND ACCEPTABLE TO THE GEOTECH AND/OR ON−SITE ENGINEER, AND RECo.

16. STRUCTURAL FOUNDATIONS, DRAINAGE ELEMENTS, SLABS, AND/OR LOADINGS PROPOSED ATOP THE MSE COMPACTED MASS SHALL BE CONSTRUCTED ONLY AFTER THE GEOTECH HAS DETERMINED THAT SUFFICIENT SETTLEMENT OF THE M.S.E. STRUCTURE AND EMBANKMENT HAS TAKEN PLACE TO ADEQUATELY SUPPORT THE SUPERIMPOSED ELEMENTS AND/OR LOADINGS.

17. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF ANY GUARDRAIL, FENCE AND/OR LIGHT POSTS (ETC.) BEHIND THE RECo WALL PANELS. PRIOR TO THE PLACEMENT OF THE TOP LAYER(S) OF SOIL REINFORCEMENT STRIPS, INDIVIDUAL STRIPS MAY BE SKEWED TO AVOID THE PROPOSED VERTICAL OBSTRUCTIONS IF AUTHORIZED BY RECo. ANY DAMAGE DONE TO THE SOIL REINFORCEMENT STRIPS DUE TO THE INSTALLATION OF THE VERTICAL OBSTRUCTIONS SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR, AND AT THE CONTRACTOR'S EXPENSE.

18. IF EXISTING AND/OR PROPOSED STRUCTURES, PIPES, FOUNDATIONS OR SAFETY GUARDRAIL POST WHICH ARE LOCATED WITHIN THE RECo VOLUME MASS, AND MAY INTERFERE WITH THE NORMAL PLACEMENT OF THE SOIL REINFORCING STRIPS AND SPECIFIC DIRECTION HAS NOT BEEN PROVIDED ON THE PLANS, THE CONTRACTOR SHALL NOTIFY RECo TO OBTAIN NECESSARY DETAILS FOR REINFORCING STRIP PLACEMENT.

19. ALL DESIGN, DETAILING, FABRICATION AND CHECKING OF REQUIRED REINFORCING STEEL FOR ANY C.I.P. CONCRETE WORK IS THE RESPONSIBILITY OF THE CONTRACTOR, UNLESS OTHERWISE STATED AND DETAILED WITHIN THESE PLANS PREPARED BY THE REINFORCED EARTH COMPANY.

20. PRECAST TOP OUT PANELS BENEATH CAST−IN−PLACE COPING, PRECAST COPING AND PRECAST TRAFFIC BARRIER (LEVEL UP CONCRETE) MAY HAVE #4 DOWELS PROTRUDING FROM THE PANELS AS DETAILED IN PANEL CASTING SHOP DRAWINGS. DOWELS SHALL BE FIELD CUT BY CONTRACTOR WHERE PANELS ARE EMBEDDED INTO A CAST IN PLACE MOMENT SLAB OR OTHER FOOTING/SLAB ELEMENT. EXPANSION JOINT MATERIAL, AND/OR BOND BREAKER SHALL BE PLACED BETWEEN EACH SIDE OF FACING PANEL IN CONTACT WITH CAST IN PLACE CONCRETE ELEMENTS (EXCEPT AS SHOWN IN THE PLANS).

21. THE CONTRACTOR IS RESPONSIBLE FOR GRADUALLY DEFLECTING THE UPPER LEVEL OF SOIL REINFORCEMENT STRIPS DOWNWARD TO AVOID CONFLICTS WITH PAVING AND ROADWAY SUBGRADE PREPARATION. THE CONTRACTOR'S ATTENTION IS DIRECTED ESPECIALLY TO SITUATIONS WHERE ROADWAY SUPER−ELEVATION AND/OR SOIL MIXING ARE ANTICIPATED. SPECIAL ATTENTION SHOULD BE DIRECTED TO PROPER PLACEMENT OF IMPERVIOUS MEMBRANES, GEOTEXTILES, FOUNDATION AREAS AND UNDERGROUND UTILITIES. A MINIMUM OF 3" SELECT BACKFILL COVER IS REQUIRED BETWEEN SOIL REINFORCING STRIPS AND ANY ELEMENT OTHER THAN SELECT FILL MATERIAL.

22. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING STORM WATER DRAINAGE IN THE VICINITY OF THE WALL DURING CONSTRUCTION. STORM WATER RUNOFF IS TO BE COLLECTED AND DISCHARGED AWAY FROM THE WALL AND THE REINFORCED BACKFILL MASS. M.S.E. WALL BACKFILL SHALL NOT BE PLACED OR TRAVELED UPON WHEN SATURATED. COMPACTED BACKFILL SHALL BE RE−WORKED OR ALLOWED TO DRY WHEN THE MOISTURE CONTENT EXCEEDS OPTIMUM.

23. FINISHED GRADE TREATMENT DESIGN ALONG TOP AND TOE OF M.S.E. WALLS, INCLUDING EROSION CONTROL, IS THE RESPONSIBILITY OF THE CIVIL ENGINEER OF RECORD.

MATERIALS NOTES:

24. SELECT BACKFILL GRADATION REQUIREMENTS:

SIEVE SIZE	MIN. PERCENT PASSING
4"	100
No. 40	0 − 60
No. 200	0 − 15

PLASTICITY INDEX (PI), AS DETERMINED BY AASHTO T−90, SHALL NOT EXCEED 6.

25. SELECT BACKFILL ELECTROCHEMICAL REQUIREMENTS:

PROPERTY	REQUIREMENT	TEST METHOD
RESISTIVITY	MINIMUM 3,000 ohm−cm AT 100% SATURATION	AASHTO T−288 / ASTM G−57
pH	4.5 TO 9	AASHTO T−289 / ASTM G−51
CHLORIDES*	MAXIMUM 100 ppm	AASHTO T−291 / ASTM D−512
SULFATES*	MAXIMUM 200 ppm	AASHTO T−29 / ASTM D−516

* IF THE MINIMUM RESISTIVITY EXCEEDS 5,000 ohm−cm AT 100% SATURATION, THE NEED FOR TESTING OF CHLORIDES AND SULFATES IS WAIVED.

SPECIAL REFERENCE KEY:
- THE REINFORCED EARTH COMPANY (HEREINAFTER REFERRED TO AS "RECo")
- GEOTECHNICAL ENGINEER OF RECORD (HEREINAFTER REFERRED TO AS "GEOTECH")
- MECHANICALLY STABILIZED EARTH (HEREINAFTER REFERRED TO AS "MSE")
- CAST−IN−PLACE (HEREINAFTER REFERRED TO AS "C.I.P.")
- INTERNAL STABILITY: FAILURE MODES NOT ENGAGING OUTSIDE THE VOLUME LIMITED BY THE TOP OF LEVELING PAD ELEVATION, THE TOP OF PANEL ELEVATION, THE FACING ELEMENTS AND THE END OF THE SOIL REINFORCEMENT.
- INTERNAL STABILITY INCLUDES:
  - SOIL REINFORCEMENT TENSILE CAPACITY
  - SOIL REINFORCEMENT PULL−OUT CAPACITY
  - FACING ELEMENTS STRUCTURAL CAPACITY
  - STRUCTURAL CAPACITY OF CONNECTIONS BETWEEN SOIL REINFORCEMENTS AND FACING ELEMENTS.

26. SELECT BACKFILL DURABILITY REQUIREMENTS:
    THE MATERIAL SHALL BE SUBSTANTIALLY FREE OF SHALE OR OTHER SOFT, POOR DURABILITY PARTICLES. THE MATERIAL SHALL HAVE A MAGNESIUM SULFATE SOUNDNESS LOSS OF LESS THAN 30 PERCENT AFTER FOUR (4) CYCLES, AS DETERMINED BY AASHTO T−104 (OR ASTM C−88).

27. NOMINAL STRIP LENGTHS:
    THE REINFORCING STRIPS LENGTHS SHOWN ON THESE PLANS, ARE MEASURED FROM THE REAR FACE OF THE M.S.E. WALL FASCIA PANEL, AND ARE NOMINAL LENGTHS REQUIRED BY THE DESIGN CALCULATIONS. THE REQUIRED HORIZONTAL LIMIT OF GRANULAR BACKFILL IS EQUAL TO THE NOMINAL STRIP LENGTH. ADDITIONAL GRANULAR BACKFILL BEYOND THE NOMINAL STRIP IS NOT REQUIRED BY DESIGN, HOWEVER MAY BE REQUIRED BY SPECIAL PROVISIONS AS DIRECTED BY THE OWNER'S DESIGN.

28. PANEL FINISH:
    - THE PRECAST CONCRETE FACING PANEL SHALL HAVE A PLAIN FINISH. UNLESS NOTED OTHERWISE. CORNER ELEMENTS, SLIP JOINT UNITS AND PRECAST COPING UNITS SHALL HAVE A PLAIN SMOOTH FINISH.
    - ALL FACING ELEMENTS WILL BE PROVIDED WITH NATURAL CONCRETE GRAY CEMENT. ANY PREPARATION FOR, AND APPLICATION OF PENETRATING STAIN, SEALANTS OR OTHER COATINGS SHALL BE PROVIDED BY OTHERS.

29. NOTE TO CONTRACTORS:
    ONLY THE FOLLOWING MATERIALS ARE SUPPLIED BY THE REINFORCED EARTH COMPANY:
    - PRECAST CONCRETE FACING PANELS, CORNER ELEMENTS AND SLIP JOINT COVERS.
    - SOIL REINFORCEMENTS: HIGH ADHERENCE (HA) STRIPS
    - BOLT SETS FOR ATTACHING REINFORCING STRIPS TO PANELS (BOLT, NUT & WASHER)
    - BEARING PADS, (CONTROL HORIZONTAL JOINT SPACING)
    - RUBBER SHIMS (CONTROL PANEL ALIGNMENT)
    - JOINT GEOTEXTILE AND ADHESIVE

    ANY OTHER MATERIALS CALLED FOR IN THE CONTRACT PLANS OR SPECIFICATIONS ARE TO BE SUPPLIED BY THE CONTRACTOR. ANY JOINT MATERIALS SHOWN AT THE INTERFACE OF PRECAST PANELS AND CAST−IN−PLACE CONCRETE STRUCTURES ARE TO BE SUPPLIED BY THE ERECTION CONTRACTOR. ALL SANDBLASTING, PAINTING, SEALERS OR OTHER SPECIAL APPLIED COATINGS ARE ALSO SUPPLIED/INSTALLED BY THE CONTRACTOR IN THE FIELD FOLLOWING PANEL ERECTION.

30. HANDLING, LOADING AND LIFTING PROCEDURES REFERENCED IN THESE PLANS OR THE CONSTRUCTION AND QUALITY CONTROL PROCEDURE MANUAL WHEN FURNISHED BY THE REINFORCED EARTH COMPANY ("RECo"), ARE GENERAL IN NATURE AND DO NOT INCLUDE ANY ANALYSIS OR ASSESSMENT OF SITE SPECIFIC CONDITIONS, THE NATURE OF ANY EQUIPMENT USED BY OTHERS, OR MEANS AND METHODS UTILIZED BY ANY CONTRACTOR, FABRICATOR, OR DELIVERY COMPANY. ALL FIRMS OR ENTITIES USING THESE PLANS OR INVOLVED IN THE HANDLING, TRANSPORT, LOADING, UNLOADING OR ERECTION OF PRODUCTS SUPPLIED BY RECo. SHALL MAKE AN INDEPENDENT REVIEW AND ASSESSMENT OF ALL HANDLING, LOADING AND LIFTING CONDITIONS AND PROCEDURES AND SHALL NOT SOLELY RELY ON ANY GENERAL RECOMMENDATIONS SUPPLIED BY RECo. THE CONTRACTOR SHALL DEVISE AND EXECUTE PROJECT SPECIFIC PROCEDURES FOR HANDLING, LOADING AND LIFTING WHICH COMPLY WITH ALL FEDERAL, STATE AND LOCAL SAFETY LAWS, REGULATIONS AND REQUIREMENTS AND ALL APPLICABLE CONTRACT REQUIREMENTS AT ALL LOCATIONS WHERE RECo MATERIALS ARE LOADED, UNLOADED, HANDLED OR ERECTED.

CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83108
REGISTERED
PROFESSIONAL ENGINEER
4/30/20

The design contained on these drawings is based on information provided by the Owner. On the basis of this information, The Reinforced Earth Company has designed, and is responsible for the internal stability of the structure only. External stability, including foundation (bearing capacity and settlement) and global stability (including sliding and rotation), is the responsibility of the Owner.

DESIGNED: MS	DRAWN: MS	REVIEWED: CA	DATE: 04/27/2020
CHECKED: CA	REVISED:		PID No: 96833

GENERAL NOTES
CUY−IR490/SR010−2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY−IR490
SR010−2.09/19.28

02 OF 6

18631

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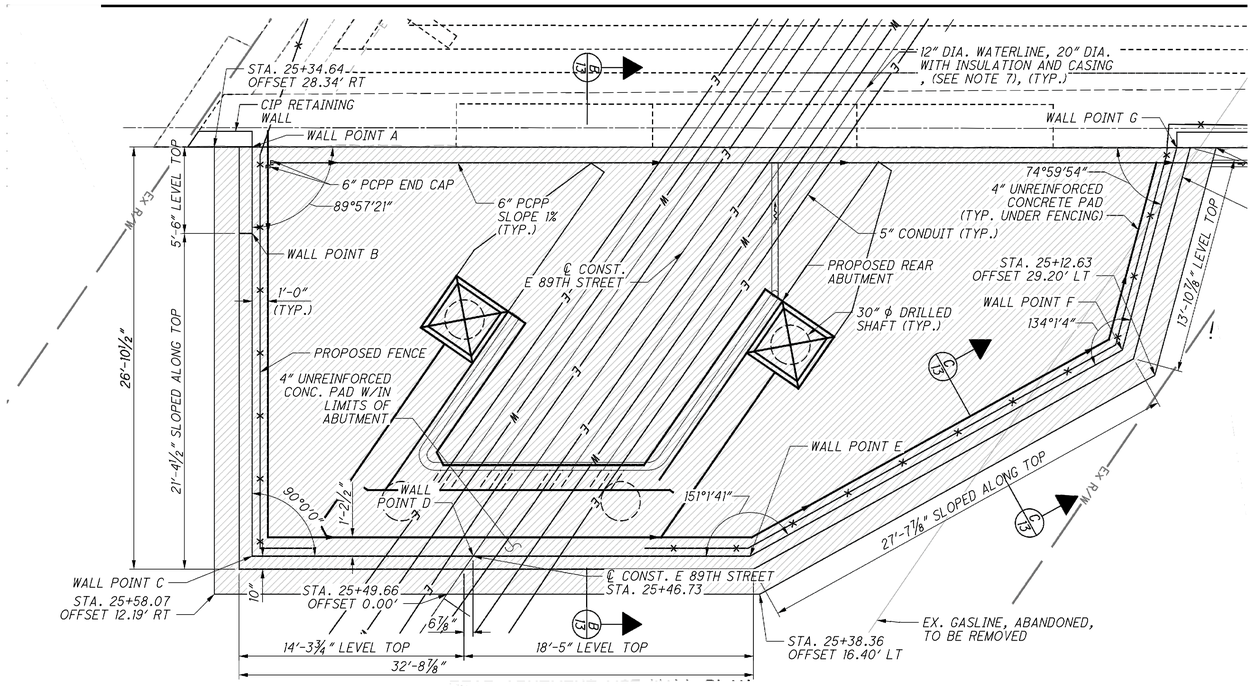

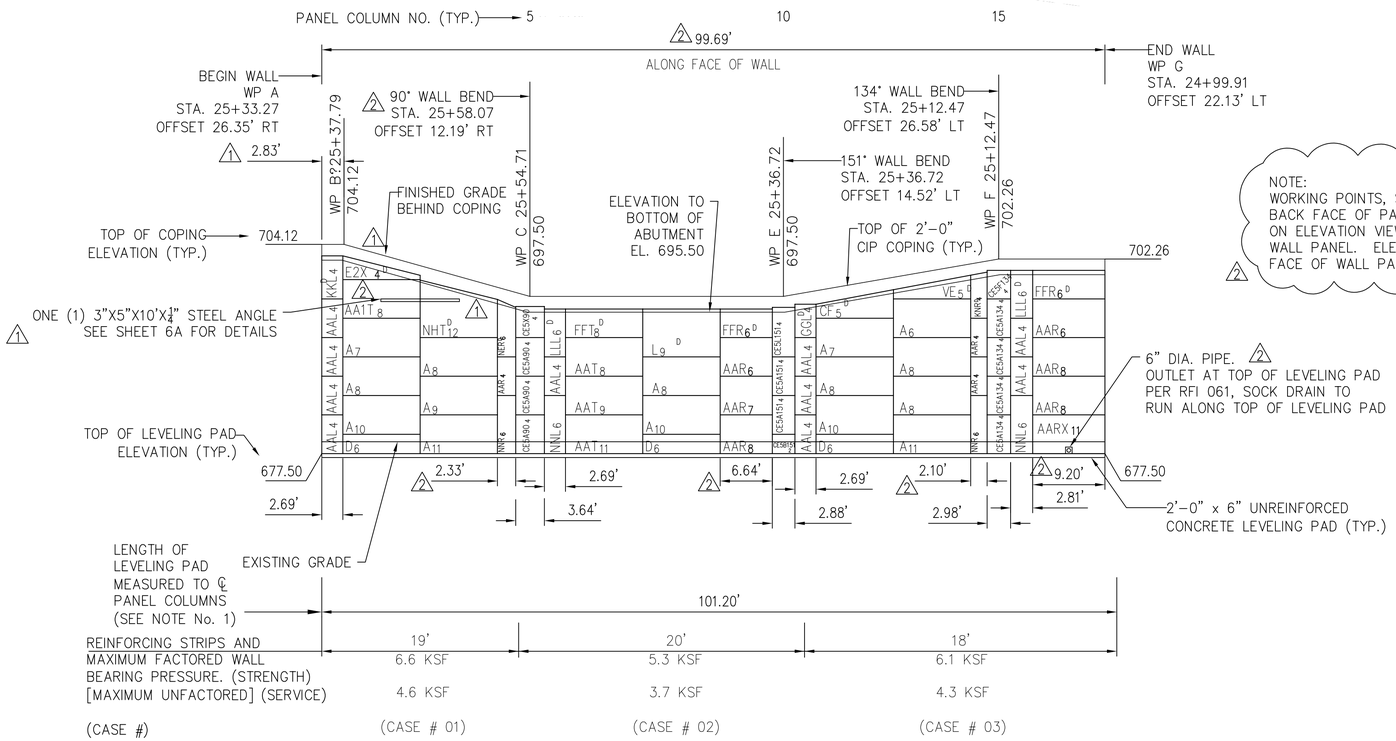

NOTE:
WORKING POINTS, STATIONS, AND OFFSETS ARE GIVEN TO BACK FACE OF PANELS. HOWEVER, DIMENSIONS SHOWN ON ELEVATION VIEW ARE GIVEN ALONG FRONT FACE OF WALL PANEL. ELEVATION VIEW ARE SHOWN TO FRONT FACE OF WALL PANEL.

NOTE:
FOR "M" AND "N" HEIGHT PANELS AT THE TOP OF A WALL, THE PANELS SHALL BE PLACED, CLAMPED AND BACKFILLED TO AT LEAST 10" ABOVE BOTTOM ROW OF TIE STRIPS EMBEDDED IN THE "M" OR "N" PANEL WITHIN THE SAME DAY. NO "M" OR "N" HEIGHT PANEL SHALL BE PLACED AND CLAMPED AND THEN LEFT OVERNIGHT WITHOUT ALSO PLACING AT LEAST 10" OF BACKFILL OVER THE BOTTOM ROW OF REINFORCING STRIPS. AS AN ALTERNATIVE TO THIS BACKFILL REQUIREMENT, THE "M" OR "N" PANEL MAY BE EXTERNALLY BRACED IN ADDITION TO BEING CLAMPED TO ADJACENT PANELS.

PANEL KEY:

AARX 6 D
- AARX: PANEL FORM SHAPE
- 6: NO. OF REQUIRED TIE STRIPS
- D: COPING DOWEL
- REQUIRED PANEL CUT EDGE (R) = RIGHT SIDE (L) = LEFT SIDE
- TYPE

PLAN VIEW NOTE:

1. THE PLAN VIEW SHOWN ON THIS SHEET WERE COPIED FROM THE CONTRACT PLANS AND WERE ATTACHED ON THE REINFORCED EARTH COMPANY DRAWINGS FOR INFORMATION ONLY. THIS INFORMATION WAS DESIGNED, DETAILED, AND SEALED BY 2LMN, INC. THE REINFORCED EARTH COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY.

NOTES

1. LENGTH OF LEVELING PAD IS BASED ON INDIVIDUAL PANEL WIDTHS FROM ℄ OF PANEL JOINT TO ℄ OF PANEL JOINT.
2. TOP OF WALL ELEVATIONS ARE SHOWN TO TOP OF COPING.
3. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.

CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83108
REGISTERED
PROFESSIONAL ENGINEER
10/16/2020

ELEVATION VIEW – FRONT FACE REAR ABUTMENT AT EAST 89TH ST.

2	10/15/20	REVISED PER ODOT COMMENT
1	6/4/20	REVISED PER 2LMN COMMENT

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REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DRAWN: MS | REVIEWED: CA | DATE: 04/27/2020 | PID No: 96833
DESIGNED: MS | REVISED: | CHECKED: CA

MSE PLAN & ELEVATION VIEW
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

18631

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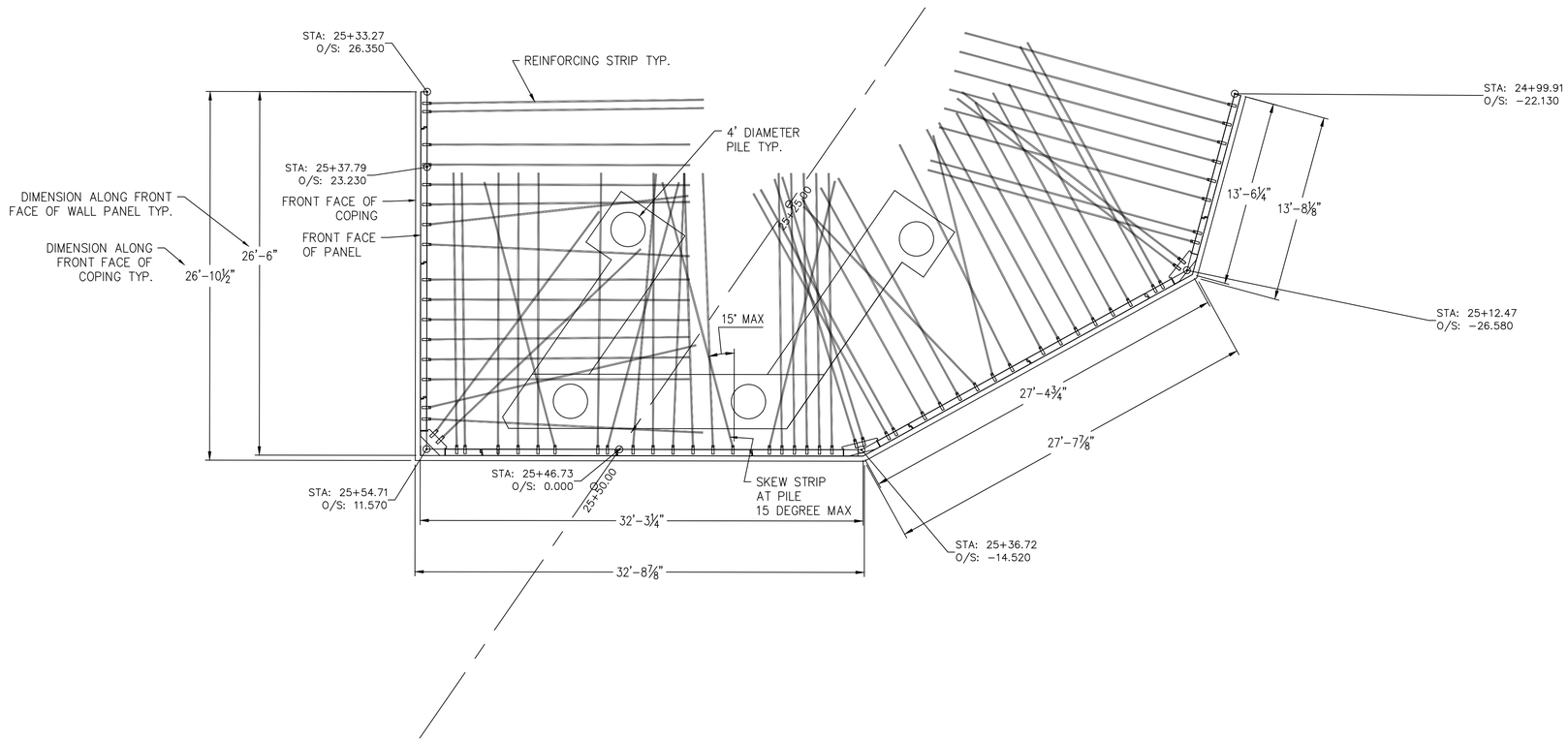

STRIP SKEW PLAN VIEW

SCALE: 1" = 10'

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CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83498
REGISTERED
PROFESSIONAL ENGINEER
10/16/2020

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DESIGNED: MS	DRAWN: MS	REVIEWED: CA	DATE: 04/27/2020
CHECKED: CA	REVISED:		PID No: 96833

GENERAL NOTES
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

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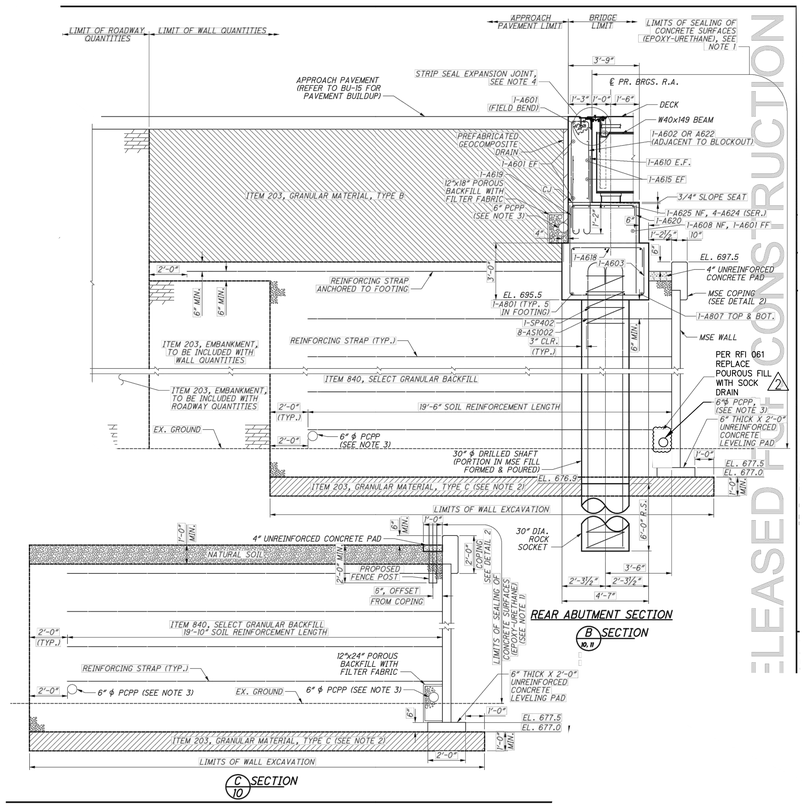
NEW ABUTMENT STRAP CONFIGURATION DUE TO CONFLICT WITH ABUTMENT WING WALLS - REVISED - 12/23/20

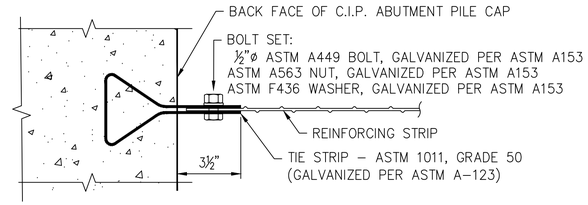
PLAN VIEW NOTE:

1. THE SECTION VIEWS SHOWN ON THIS SHEET WERE COPIED FROM THE CONTRACT PLANS AND WERE ATTACHED ON THE REINFORCED EARTH COMPANY DRAWINGS FOR INFORMATION ONLY. THIS INFORMATION WAS DESIGNED, DETAILED, AND SEALED BY 2LMN, INC. THE REINFORCED EARTH COMPANY IS RESPONSIBLE FOR INTERNAL STABILITY OF THE STRUCTURE ONLY.

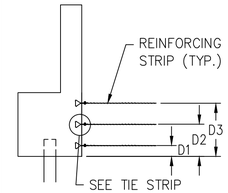


BACKWALL TIE STRIP AND REINFORCING STRIP CHART

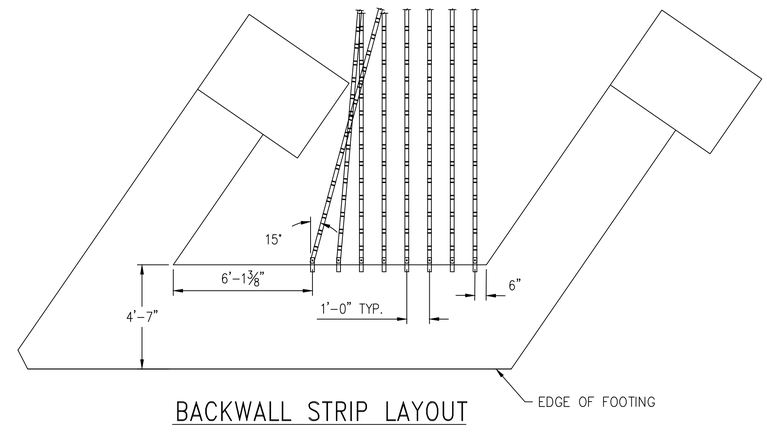
WALL NAME	DISTANCE (FT.)	REINF. STRIP LENGTH (FT.)	HORIZONTAL SPACING	TIE STRIP QUANTITY PER LEVEL	TOTAL/ ABUT.	NOTE AND DIAGRAM
REAR	0.50	16	~12"	8	24	ABUTMENT BACKWALL STRIPS SPACING STRIP LENGTH AND QUANTITY.
	1.50	16	~12"	8		
	2.50	16	~12"	8		



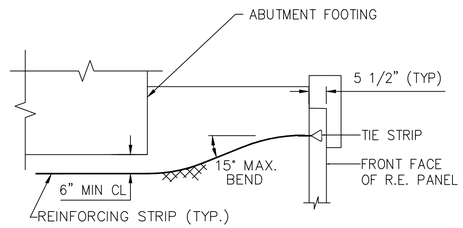
TIE STRIP PLACEMENT DETAIL
SCALE: NONE



NOTE:– THE FIRST AND LAST TIE STRIP SHALL BE PLACED 6" MIN. FROM EDGE OF BACKWALL.



BACKWALL STRIP LAYOUT



TYPICAL REINFORCING STRIP BENDING DETAIL

SCALE: 1/2" = 1'-0"

NOTE: DEFLECT STRIP GRADUALLY (15° MAX) WHERE REQUIRED TO ACHIEVE 6" MIN CLEARANCE FROM BOTTOM OF ABUTMENT

1	10/15/20	REVISED PER ODOT COMMENT

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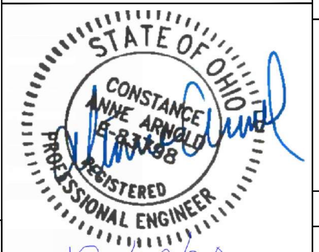

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DESIGNED:	DRAWN:	REVIEWED:	DATE:
MS	MS	CA	04/27/2020
CHECKED:	REVISED:		PID No:
CA			96833

TYPICAL MSE SECTION(S) & DETAILS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

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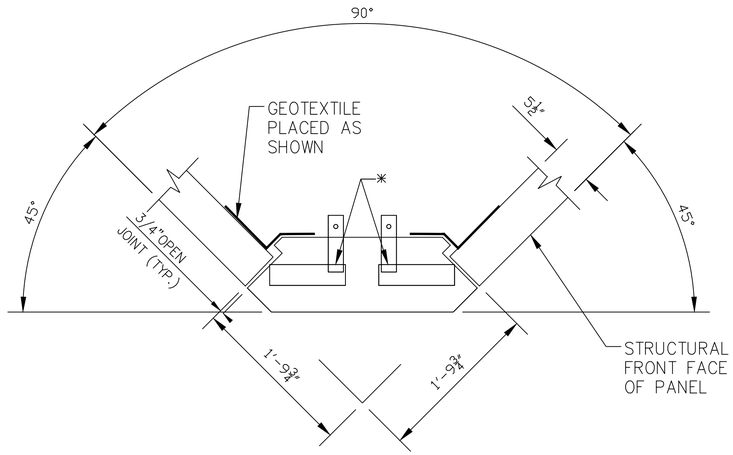
18631

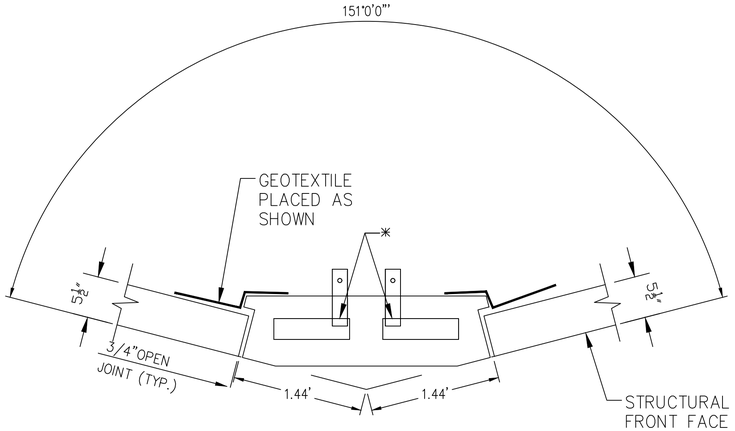
R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Dwg\(2020-04-27) 18631 R. Abut. At E. 89th St. MSE Wall Design.dwg



90° WALL BEND PLAN DETAIL

N.T.S

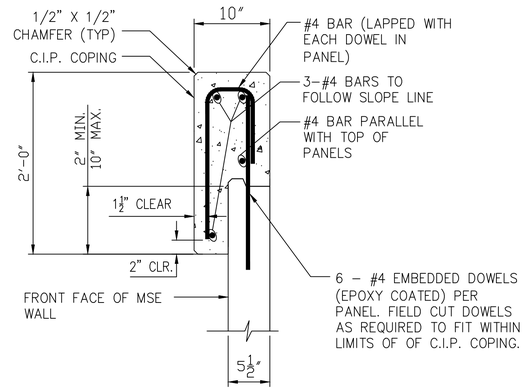
* NOTE: PLACE BEARING PADS AS SHOWN COLUMN 5 (2)



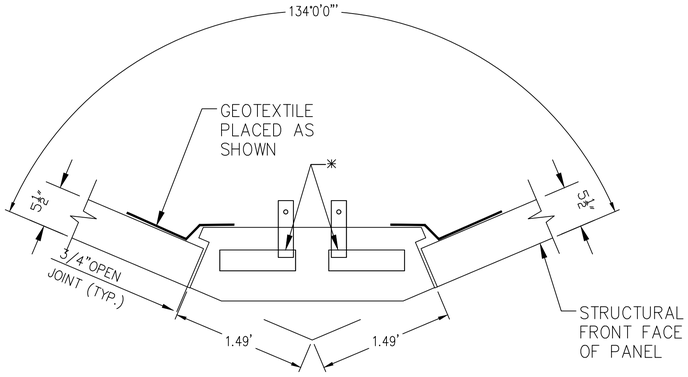
151° WALL BEND PLAN DETAIL

N.T.S

* NOTE: PLACE BEARING PADS AS SHOWN COLUMN 10



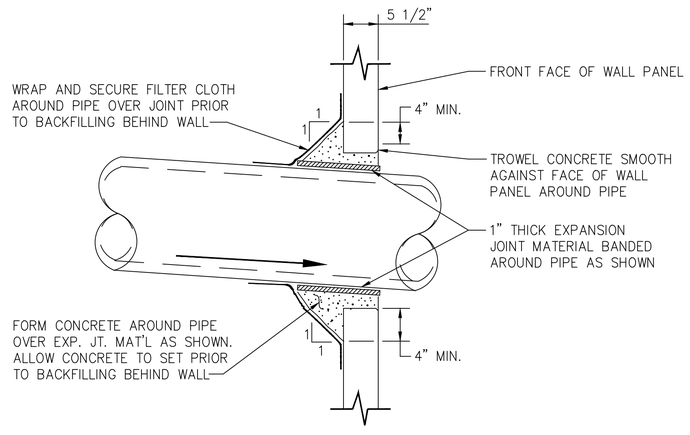
C.I.P. COPING DETAIL



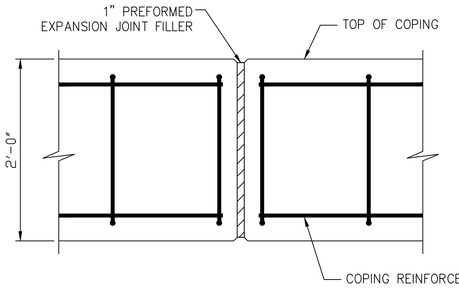
134° WALL BEND PLAN DETAIL

N.T.S

* NOTE: PLACE BEARING PADS AS SHOWN COLUMN 15

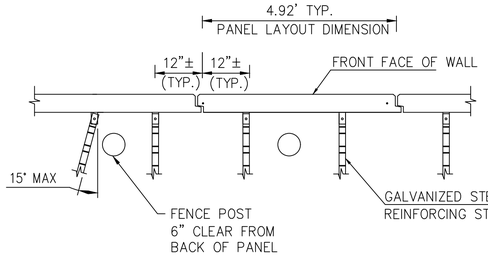


(2) PIPE PENETRATION AT WALL FACE DETAIL



COPING EXPANSION JOINT - ELEVATION

COPING JOINTS SHALL ALIGN WITH JOINTS BETWEEN MSE WALL PANELS. COPING JOINTS SHALL NOT BE LOCATED MORE THAN 20 FEET APART. THE CONTRACTOR SHALL COORDINATE JOINT LAYOUT WITH DETAILS OF ACTUAL PROPRIETARY WALL CONSTRUCTED. (2)

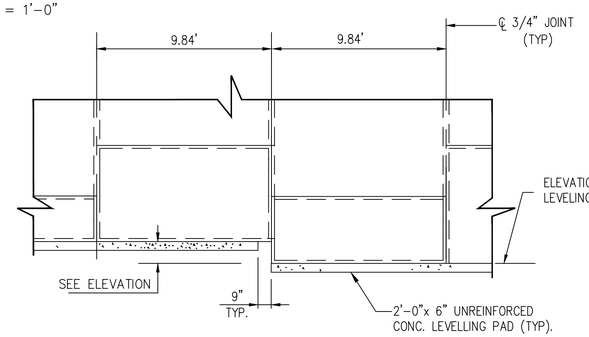


NOTE:
PRIOR TO PLACING FENCE POST FOUNDATIONS, CONTRACTOR SHALL MARK LOCATION ON BACK-FACE OF WALL AND SKEW REINFORCING STRIPS TO AVOID THE OBSTRUCTION. OR PLACE SONOTUBE/PVC PIPE FOR FUTURE GUIDERAIL PLACEMENT, SUCH THAT PLACEMENT OF REINFORCING STRIPS IS NOT OBSTRUCTED.
IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION OF FENCE POSTS BEHIND THE REINFORCED EARTH PANELS PRIOR TO PLACEMENT OF THE TOP TWO LEVELS OF REINFORCING STRIPS. ANY DAMAGE DONE TO THE REINFORCING STRIPS DUE TO THE INSTALLATION OF FENCE POSTS SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

FENCE POST BEHIND WALL

SCALE 1/2" = 1'-0"

SCALE: 1" = 1'-0"



TYPICAL LEVELING PAD STEP DETAIL

(2)	10/15/20	REVISED PER ODOT COMMENT

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CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DESIGNED: MS | DRAWN: MS | REVIEWED: CA | DATE: 04/27/2020
CHECKED: CA | REVISED: | PID No: 96833

TYPICAL MSE SECTION(S) & DETAILS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

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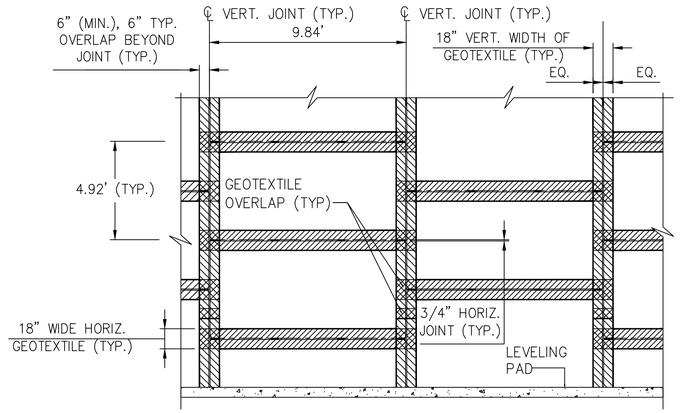
18631

R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Dwg\(2020-04-27) 18631 R. Abut. At E. 89th St. MSE Wall Design.dwg

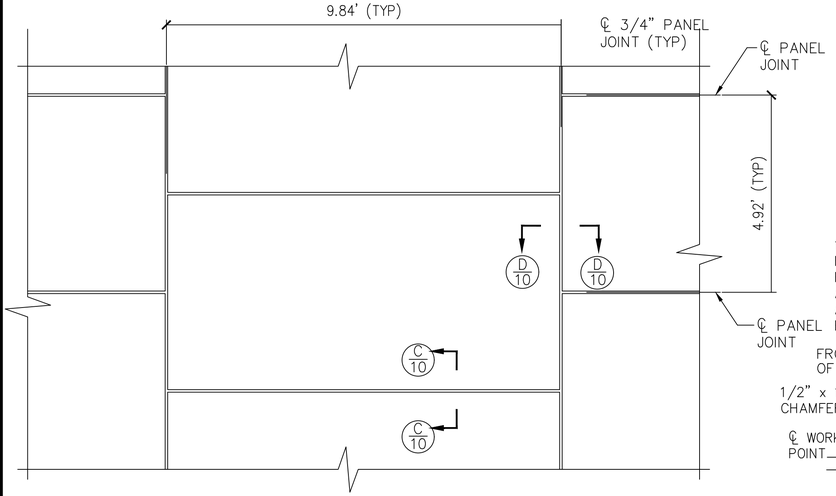


GEOTEXTILE PLACEMENT DETAIL
BACK FACE – RECTANGULAR PANELS

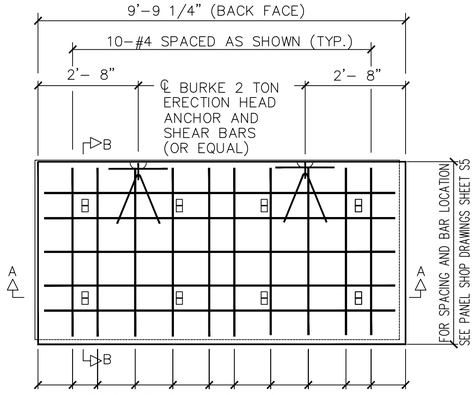
PROPER INSTALLATION OF GEOTEXTILE AT PANEL JOINTS IS IMPERATIVE IN PREVENTING LOSS OF BACKFILL MATERIAL.

GEOTEXTILE PLACEMENT RECOMMENDATIONS:

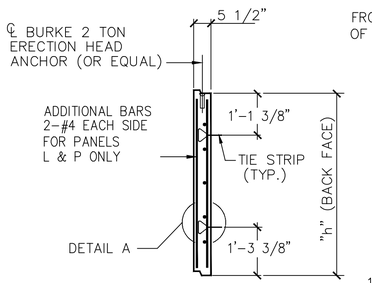
- PANEL GEOTEXTILE SHALL BE FIRMLY AFFIXED TO BACK OF PANEL AS SHOWN USING ADHESIVE SUPPLIED BY THE REINFORCED EARTH CO. APPLY ADHESIVE ON BACK FACE OF PANELS AND NOT ON GEOTEXTILE. DO NOT APPLY ADHESIVE WITHIN 2" OF PANEL JOINTS.
- PANEL GEOTEXTILE SHALL BE APPROXIMATELY CENTERED ON JOINTS.
- PANEL GEOTEXTILE SHALL HAVE A 12" MIN. OVERLAP. VERTICAL GEOTEXTILE SHALL OVERLAP HORIZONTAL GEOTEXTILE. WHEN TWO VERTICAL GEOTEXTILES OVERLAP, THE UPPER PIECE SHALL OVERLAP THE LOWER. PANEL GEOTEXTILE IS NOT REQUIRED AT THE INTERFACE BETWEEN PANEL AND LEVELING PAD UNLESS OTHERWISE NOTED IN THE DESIGN DRAWINGS.



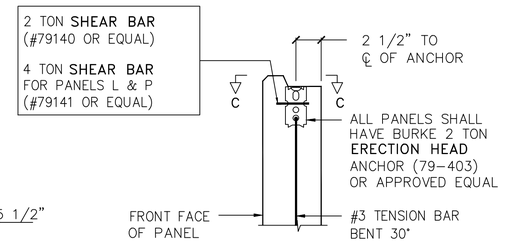
TYPICAL PANEL LAYOUT
PARTIAL ELEVATION – FRONT FACE
RECTANGULAR LARGE PANELS
NOT TO SCALE



ELEVATION – BACK FACE

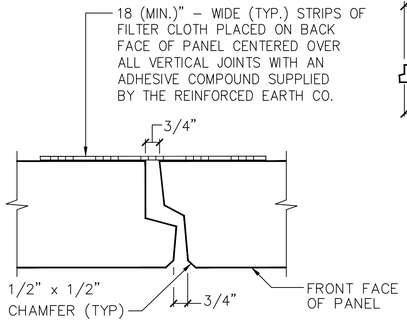


SECTION B–B

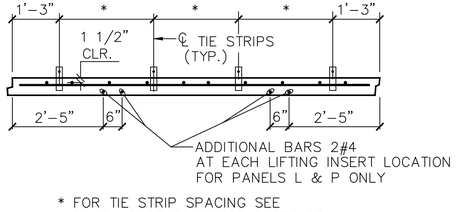


SECTION D–D
ERECTION HEAD
SCALE 3"=1'

PANEL TYPE	"h"
A	4'–10 1/4"
C	1'–9 1/2"
D	2'–4 3/4"
E	3'– 0 1/4"
F	3'–7 1/2"
G	4'–3"
K	5'–5 3/4"
L/P	6'–1"

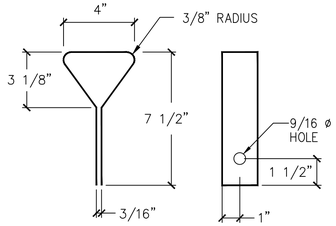


SECTION D–D
VERTICAL JOINT
SCALE: 3"=1'–0"

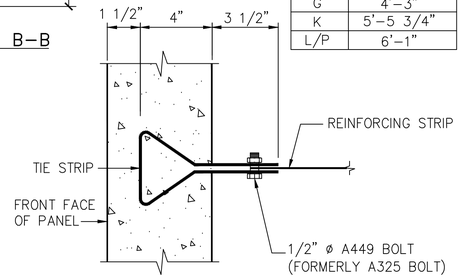


* FOR TIE STRIP SPACING SEE PANEL SHOP DRAWINGS SHEET S3

SECTION A–A
SCALE: 1/2" = 1'–0"



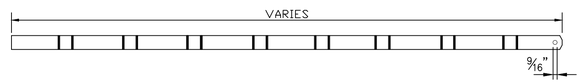
TIE STRIP DETAIL
SCALE: 3"=1'–0"



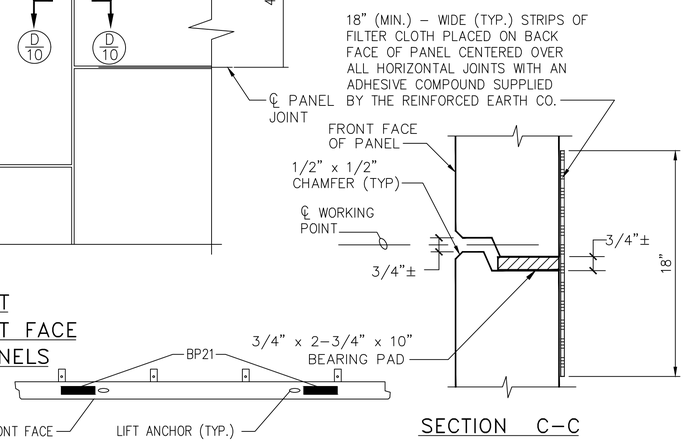
DETAIL A
TIE STRIP
EMBEDED IN PANEL
SCALE: 3"=1'–0"

NOTES:

1. REINFORCING STEEL TO BE ASTM 615, GRADE 60, EPOXY COATED PER ASTM A 775.
2. ALL PANEL TYPES AND OTHER RELATED ELEMENTS WILL BE DETAILED ON SHOP DRAWINGS.
3. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF MINIMUM TWO TON CAPACITY EACH.
4. PANEL DESIGN THICKNESS IS 5 1/2" THICKNESS OF CONCRETE.
5. CONCRETE COVER OVER ALL REINFORCEMENT TO BE 1 1/2" MINIMUM.



TYPICAL 50mmX4mm/50mmX6mm REINFORCING STRIP
NO SCALE



SECTION C–C
HORIZONTAL JOINT
SCALE: 3"=1'–0"

DETAIL 'A'
(2 PADS PER HORIZONTAL JOINT)

PANEL THICKNESS	REINFORCEMENT DESIGNATION	PANEL REINFORCEMENT (FOR PANEL TYPE "A")	MAXIMUM FACTORED HORIZONTAL STRESS AT BACK FACE OF PANEL (KSF)
5 1/2" (MIN.)	R4	10–#4 VERTICAL 5–#4 HORIZONTAL	3.50

2	10/15/20	REVISED PER ODOT COMMENT

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ReINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DATE: 04/27/2020
REVIEWED: CA
PID No: 96833
DRAWN: MS
REVISED:
DESIGNED: MS
CHECKED: CA

STANDARD PANEL DETAILS
CUY–IR490/SR010–2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY–IR490
SR010–2.09/19.28

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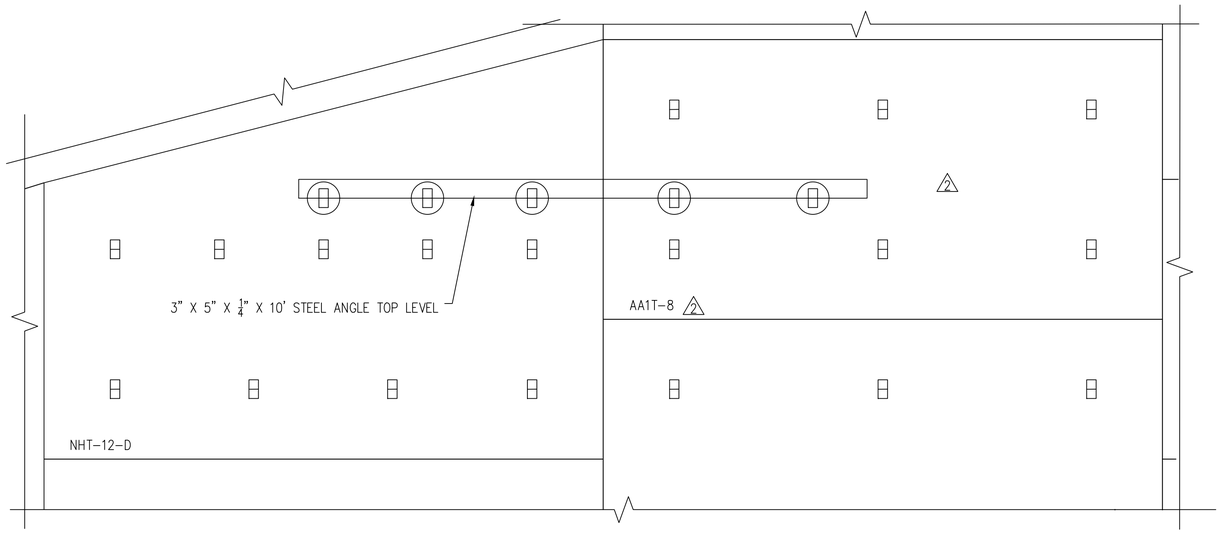


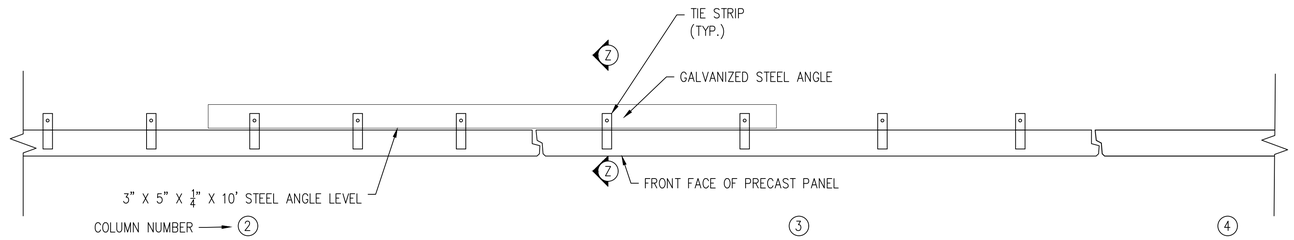
PARTIAL ELEVATION – STEEL ANGLE AT TOP STRIP LEVEL COLUMN 3

SCALE: ¾" = 1'-0"

TIE STRIP WITH NO REINFORCING STRIP CONNECTED

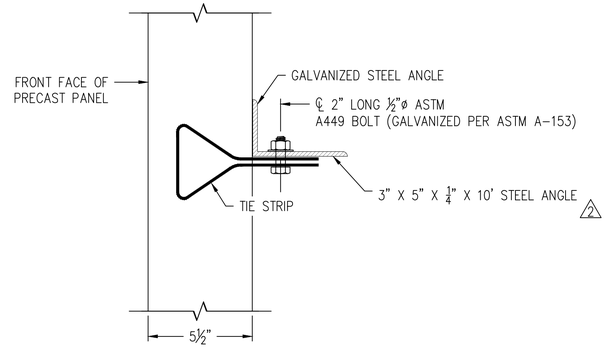
TIE STRIP WITH REINFORCING STRIP CONNECTED

IMPORTANT NOTE: ONLY THE TIE STRIP LEVEL AT THE ANGLE DOES NOT HAVE REINFORCING STRIPS ATTACHED. CONTRACTOR SHALL ATTACH REINFORCING STRIP TO TIE STRIP AT ALL OTHER LOCATION.



PARTIAL PLAN – STEEL ANGLE AT TOP STRIP LEVEL COLUMN 3

SCALE: ¾" = 1'-0"



SECTION Z-Z (ANGLE BOLTED TO TIE STRIP WITHOUT REINFORCING STRIP)

SCALE: 3" = 1'-0"

NOTES:
1. DETAIL SHOWN SCHEMATICALLY, FIELD CONDITIONS MAY VARY.

NOTE: ARCHITECTURAL FINISH NOT SHOWN IN ABOVE SECTIONS AND PLAN

2	10/15/20	REVISED PER ODOT COMMENT
1	6/4/20	REVISED PER 2LMN COMMENT

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CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83188
REGISTERED
PROFESSIONAL ENGINEER
10/16/2020

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DESIGNED: MS
DRAWN: MS
CHECKED: CA
REVIEWED: CA
DATE: 04/27/2020
REVISED:
PID No: 96833

ANGLE DETAILS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

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18631

R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Dwg\ANGLE DETAILS.dwg

The Reinforced Earth Company
45610 Woodland Rd., Suite 200, Sterling, VA 20166

Reinforced Earth Project No.: 18631
Designed by: MS **Checked by:** CA **4/27/2020**

18631

CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO

Rev 3 12/23/2020

TITLE: MSE Wall Design Submittal

REVISED CALCULATIONS DUE TO CHANGE IN ABUTMENT STRAP LAYOUT - REVISED 12/23/20

CERTIFIED WITH RESPECT TO THE INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY

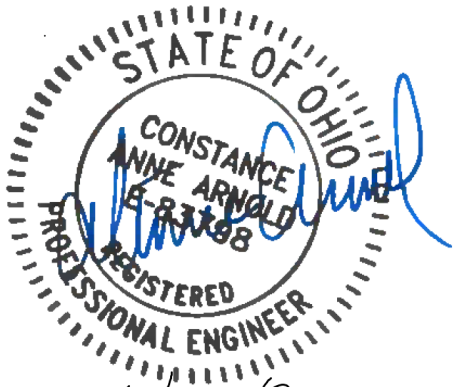
Appendix A

MSE Wall Acceptance Letter

Project No.	PID 96833
Wall No.	REAR ABUTMENT
Name of Accredited MSE Wall System	REINFORCED EARTH

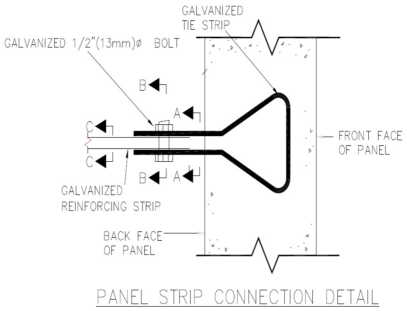
Design Data	
Design Life	100 years
Angle of Internal Friction – Reinforced Soil Zone	34 degrees
Actual Bearing Pressure at base of reinforced soil mass	4.6 KSF
Allowable Bearing Pressure at base of reinforced soil mass (Reproduced from project plans)	18.46 KSF

I hereby certify that the design calculations for the internal stability of the mechanically stabilized earth retaining structure and the detail drawings included in this construction submission are in complete conformance with the MSE wall Supplemental Specification 840 and either the AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002 or the AASHTO LRFD Bridge Design Specifications, that were used to develop the project plans. I further certify that the design data provided above and data assumed for the design calculation submitted herein is accurate for the above referenced wall.

Engineer's Seal

Signature:
Date: 4/30/20

(Provide an MSE Wall Acceptance Letter for each wall designated in the project plans.)

JOB NUMBER: 18631
JOB NAME: OC3
DESIGNED BY: MS



PANEL STRIP CONNECTION DETAIL

Galvanization and Carbon Steel Loss Rates:

Design Life of Structure =	**100**	yrs
Zinc (first 2 years):	**15**	µm/yr
Zinc (subsequent years):	**4**	µm/yr
Carbon Steel:	**12**	µm/yr
Carbon Steel (75 - 100 yrs)	**12**	µm/yr

Mechanical Properties of Reinforcement Hardware

	HA Strip	Tie Strips			
Thickness t (mm)=	4	3.42	Zinc coat t_z =	86	µm/yr
Width w (mm)=	50	50	Life of Zinc:	16	yrs
A (mm^2) =	200	171	**Bolt Set.**		
Fu (Ksi) =	80	65	∅ = d=	12.7	mm = 0.50 in.
Fy (Ksi) =	65	50	Fu =	120	Ksi

TENSILE RESISTANCE OF REINFORCING STRIP & CONNECTORS. LRFD METHOD

Tensile Resistance Resistance Factor for Metallic Reinforcement and connectors= Φ = 0.75

Section A-A (Tie Strip Only), 2 Tie Strip plates

At end of design life, carbon steel loss : 1.008mm/side, Remaining Thickness (1 plate) = 3.420- 2 x 1.008 =1.404mm

As (2 plates) = 1.404x 2 x 50 =140.400mm2 or 0.218in2, Factored Tensile Resistance= Φ FyAs =8.16Kips

Section B-B (Reinforcing Strip at Bolt Holes)

At end of design life, carbon steel loss : 0mm/side, Thickness = 4.00mm
As = 4.00 x (50.000 - 14.3)=142.80mm2 or 0.22 in2
Factored Tensile Resistance= Φ. Fu As =13.28Kips
Factored Bearing Resistance at bolt hole=Φ. Rn= Φ(2.4 d t Fu) =11.34Kips

Section B-B (Tie Strip at Bolt Holes), 2 tie strip plates with 14.3mm bolt holes,

At end of design life, carbon steel loss : 1.008mm/side, Remaining Thickness (1 plate, corrosion on 1 side) = 3.420 - 1.008 =2.412

A (2 plates) = 2.412 x 2 x [50 - 14.3] = 172.217mm2 or 0.267in2
Factored Tensile Resistance=Φ Fu As =13.01Kips
Factored Bearing Resistance at bolt hole=Φ . Rn=Φ(2.4 d t Fu) =11.11Kips

Section B-B (Shear Resistance of Bolt)

At end of design life, carbon steel loss : 0mm/side, Area of Bolt = 126.68mm2= 0.1963in2
Factored Shear Resistance =Φ Rn= Φ(0.48 Fu Ab Ns) =16.96Kips

Section C-C (Reinforcing Strip)

At end of design life, carbon steel loss : 1.008mm/side, Remaining Thickness = 4.000- 2 x 1.008 =1.984mm

As = 1.984x 50 =99.200mm2 or 0.154in2, Factored Tensile Resistance= Φ Fy As =7.50Kips

RESULTS:
Section A-A (Tie Strip)= 8.16Kips
Section B-B (TS at bolt hole), a) Factored Tensile Resistance= 13.01Kips
b) Factored Bearing Resistance @ bolt hole= 11.11Kips
Section B-B (RS at bolt hole), a) Factored Tensile Resistance= 13.28Kips
b) Factored Bearing Resistance @ bolt hole= 11.34Kips

Section B-B (Bolt)= 16.96Kips
Section C-C (Reinf. Strip)= 7.50Kips, CONTROLS

JOB NUMBER :18631 04/28/20
Job Name : OC3
Designed By : MS

Reinforced Earth Design Calculations

L R F D M E T H O D - A A S H T O, 2015

Material Properties

REINFORCING STRIPS and/or LADDER REINFORCING STRIPS Fy = 65Ksi

Wall Geometry

HEIGHT OF WALL = H ft SOIL REINFORCEMENT LENGTH = B ft

Soils Properties

	Unit Weight - Kcf	Φ(deg)	Cohesion -Ksf	Ka (Rankine)	Ko	f*max@ground surface , SteelStrips
Select Material	0.120	34.00	-	0.28	0.44	2.000
Random fill	0.120	30.00	0.00	0.33	-	
Foundation	-	30.00	0.00			

f* = Apparent Coefficient Of Friction (Bond)=2.000 @ top, f*min at 20ft depth = 0.675

Load and Resistance Factors

BEARING PRESSURE &REINFORCEMENT TENSION & PULL-OUT	Strength I(Static)	Extreme Event I (Seismic)
Vertical Dead Load (MSE Backfil-) -Tension & Pull-Out force in Internal Stability	1.35	1.35
Vertical Dead Load, Pull-Out Resisting force.	1.00	1.00
Horizontal Earthpressure due to Random Backfill	1.50	1.00
Horizontal Earthpressure due to Live Load surcharge	1.75	0.50
Live Load Weight	1.75	0.50
Dynamic Earthpressure and RE mass Dynamic Inertia Force (Extreme Event I)	-----	1.00
Tensile Resistance of soil reinforcements	0.75	1.00
Resistance Factor for Pull Out of Strips (Internal Stability).	0.90	1.20
SLIDING & OVERTURNING		
Vertical Dead Load	1.00	1.00
Horizontal Earthpressure due to Random Backfill	1.50	1.00
Horizontal Earthpressure due to Live Load surcharge	1.75	0.50
Dynamic Earthpressure and RE mass Dynamic Inertia Force (Extreme Event I)	-----	1.00
Resistance Factor for Base Sliding (Mass Stability)	1.00	1.00

Wind on Structures (Strength III), Load Factor = 1.40, AASHTO 2015 and before
Vehicular Collision Force (Extreme Event II) Load Factor = 1.00
Equivalent Height For Traffic Surcharge (Where Applicable)=2.08ft or 0.25Ksf
Coefficient Of Friction At Foundation Level (Sliding) = 0.58
Tributary Panel Width = 9.84ft, Vertical spacing of reinforcement =2.46ft
Horizontal Stress @ Facing= 100% Of Maximum Stress @ Line Of Active Zone. .
Factored Maximum Reinforcement Tension = 7.50Kips / strip

REINFORCED EARTH

04/28/20

JOB NUMBER :18631 DESIGNED : MS COMMENTS: Case 01

MASS STABILITY AND MAXIMUM BEARING PRESSURE - LRFD STATIC , RANKINE'S THEORY

H = 26.62ft, H'(active zone) = 26.62ft, B = 19.00ft

OHIO -LRFD DESIGN TYPE : LEVEL SURCHARGE

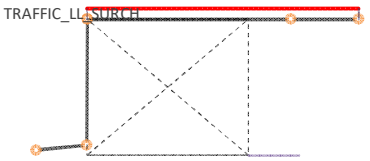
Equiv. height Traffic Live Load Surcharge= 2.08ft or 0.25Ksf. Equiv. height Train/Crane Surch. 0.00ft or 0.00Ksf @ 0.00ft clear from panel & over 0.00ft width

Coeff. Active Earthpressure= Ka =0.3333

Foundation,Coeff. of friction@ bott/wall=0.58, Cohesion=0.00Ksf, Tributary width= 9.84ft

f*= Coefficient of apparent friction @finished grade = 2.00

Select Fill γ=0.120Kcf, Φ=34.00˚, Rand. Fill γ=0.120Kcf, Φ=30.00˚, Rand.Cohes=0.00Ksf -



STATIC MASS STABILITY -FACTORED

VERTICAL LOADS (Kips)		Arm (ft)	Moment (Kip-ft)	
60.69		9.50	576.6	
0.00	60.69	19.00	0.0	576.59
0.00		19.00	0.0	
0.00		0.00	0.0	
0.00	Crane/Footg weight	9.50	0.0	
0.00	VertComp.Pa	19.00	0.0	
0.00	VertComp.Ps	19.00	0.0	
0.00	VertComp.Ppsv	19.00	0.00	
60.69			576.59	

FACTORED HORIZONTAL LOADS, RANKINE'S THEORY

21.26	HorizCompontPa	8.87	188.6	Soil
3.88	HorizCompontPs	13.31	51.6	Traffic LiveLoad
0.00	HorizComp.Ppsv	13.31	0.0	Train/Crane Surch
25.13			240.22	

CAPACITY/DEMAND RATIO (**CDR**)

1) OVERTURNING	2.40	>=1.0, OK
2) SLIDING	1.39	>=1.0, OK

Bearing Pressure

STATIC MASS STABILITY -FACTORED VERTICAL LOAI			Arm (ft)	MOMENT (Kip-ft)		
1.35DL	1.00DL	1DL +0.0LL		1.35DL	1.00DL	1DL +0.0LL
81.94	60.69	60.69	9.50	778.4	576.6	576.6
0.00	0.00	0.00	19.00	0.0	0.0	0.0
0.00	0.00	0.00	19.00	0.0	0.0	0.0
8.30	8.30	0.00	9.50	78.8	78.8	0.0
90.24	68.99	60.69		857.2	655.4	576.6

HORIZONTAL LOADS (SAME AS FOR MASS STABILITY, static case)

1.35DL factor, Eccent. = 2.66ft<= B/ 3.00 =6.33ft, OK, Factored Bearing Pressure = 6.60Ksf

1.00DL, Eccent. = 3.48ft<= B/ 3.00 =6.33ft, Factored BP = 5.73Ksf

1.00DL+0.0 LL, Eccent. = 3.96ft<= B/ 3.00 =6.33ft, OK, Factored BP = 5.48Ksf

Unfactored Bearing Pressure @ toe of wall = 4.59Ksf

REINFORCED EARTH INTERNAL STABILITY SUMMARY - Coherent Gravity Method LargeRectangPanel

Steel Strips

LEVEL	Factored Horiz. Stress σ_h @ Fac'g -Ksf	Density Strips 50x4mm	Factored Tension <= 7.50Kips	Factored Stress σ_h (Bond)-Ksf	Effective Length CDR >=1.0	Reinforc. Length	Minimum Density Req'd
2.000	0.32	3	2.62	0.14	1.30	19.00ft	(2.30)
5.710	0.55	4	4.16	0.38	1.27	19.00ft	(3.16)
8.170	0.68	3	5.52	0.52	1.11	19.00ft	(2.71)
10.630	0.81	3	6.56	0.66	1.01	19.00ft	(2.96)
13.090	0.93	4	5.65	0.79	1.21	19.00ft	(3.29)
15.550	1.05	4	6.34	0.91	1.20	19.00ft	(3.38)
18.010	1.16	4	7.01	1.03	1.14	19.00ft	(3.74)
20.470	1.28	5	6.20	1.16	1.33	19.00ft	(4.14)
22.930	1.49	5	7.21	1.38	1.38	19.00ft	(4.81)
25.390	1.73	6	6.98	1.62	1.69	19.00ft	(5.59)

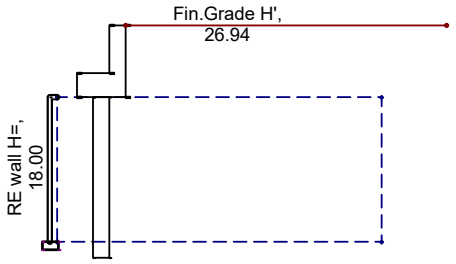
COMMENTS:Case 02 DESIGNED : MS

JOB NUMBER :18631 JOB NAME :OC3 4/28/20

(H = 18.00ft , H` = 26.94ft, B = 20.00ft)

STATIC, STRENGTH I - - OHIO -LRFD

LRFD-MASS STABILITY AND MAXIMUM BEARING PRESSURE -STATIC CASE, RANKINE'S THEORY



FACTORED VERTICAL FORCES	V - Kips	Arm - ft	MOMENT
1. R.E. mass =V1	43.20	10.00	432.00
2. Soil mass behind backwall =V2 =	15.24	12.90	196.58
3. Vertical component of Earthpressure =	0.00	20.00	0.00
4. Vertical component of Surcharge Earthpressure =	0.00	20.00	0.00
5. Vertical component of Seismic Earthpressure Pae =	0.00	20.00	0.00
ΣVERT. FORCES, static case=	58.44		628.58
ΣVERT. FORCES, seismtic case=	58.44		628.58
FACTORED HORIZONTAL FORCES	H	Arm	MOMENT
1. Earthpressure Pa	21.77	8.98	195.52
2.Earthpressure due to surcharge=Ps	3.92	13.47	52.84
3. Seismic forces a) Inertia forces(P_{ir1}+P_{ir2}+$P_{irPanel}$)	0.00		0.00
b) Dynamic earthpressure Pae	0.00		0.00
STATIC ΣH=SUM HORIZ. FORCES=Pa+Ps=	25.70		248.36

CAPACITY/DEMAND RATIO (CDR)

STATIC CASE

SLIDING = 1.31 >=1.0 O.K.
OVERTURNING = 2.53 >=1.0 O.K.

LRFD METHOD - Mass Bearing Pressure FACTORED VERTICAL FORCES	V Kips	Arm ft	MOMENT Kip-ft
1. V1	58.32		583.20
2. Soil mass behind backwall =V2 =	20.58	12.90	265.38
3. Surcharge	6.21		80.04
SUM VERT. FORCES=	85.11		928.62

Horizontal Forces and Overturning moment, see STATIC ΣH=SUM HORIZ. FORCES=Pa+Ps= above
Eccentricity from soil loads and surcharge = 2.01ft
Factored Vertical pressure from soil loads and surcharge = 5.32Ksf
UnfactoredVertical pressure from soil loads and surcharge = 3.74Ksf

STUB ABUTMENT ON PILE, ABUTMENT WIDTH= 4.58ft
HEIGHT FROM TOP OF FINISHED GRADE TO BOTTOM OF ABUTMENT= 8.94ft
DISTANCE FROM BACK FACE OF PANEL TO ABUTMENT= 1.21ft

Select Fill γ=0.120Kcf, Φ=34.00˚, Rand. Fill γ=0.120Kcf, Φ=30.00˚, Rand.Cohes=0.00Ksf -
Coefficient of Active Earthpressure = Ka = 0.3333
Foundation,Coeff. of friction@ bott/wall=0.58, Cohesion=0.00Ksf, Tributary width= 9.84ft
EQUIVALENT. HEIGHT LIVE LOAD SURCHARGE = 2.08ft

COMMENTS:Case 02 DESIGNED : MS
JOB NUMBER :18631 JOB NAME :OC3 4/28/20

REINFORCED EARTH INTERNAL STABILITY SUMMARY - Coherent Gravity Method LargeRectangPanel - OHIO -LRFD , RANKINE'S THEORY

(H = 18.00ft , H` = 26.94ft, B = 20.00ft)

HEIGHT FROM TOP OF FINISHED GRADE TO BOTTOM OF ABUTMENT= 8.94ft
DISTANCE FROM BACK FACE OF PANEL TO ABUTMENT= 1.21ft

Select Fill γ=0.120Kcf, Φ=34.00˚, Rand. Fill γ=0.120Kcf, Φ=30.00˚, Rand.Cohes=0.00Ksf - ,
Coefficient of Active Earthpressure = Ka = 0.3333
f*= Coefficient of apparent friction @finished grade = 2.00
ANGLE OF SKEW OF REINFORCING STRIPS : 15.00DEG.
STUB ABUTMENT ON PILE, ABUTMENT WIDTH= 4.58ft

Level	Fact'd σh (tension) Ksf	Density Strips 50x4mm,	Factored Reinf.Tension <=7.50Kips	Fact'd σh (Bond) Ksf	Effect.Length CDR >=1.0	Strip Length (ft)
0.75	0.64	3	5.31	0.50	1.30	20.00
2.01	0.71	3	5.91	0.58	1.20	20.00
4.47	0.84	3	6.99	0.71	1.03	20.00
6.93	0.95	4	5.95	0.83	1.34	20.00
9.39	1.06	4	6.67	0.99	1.21	20.00
11.85	1.21	5	6.08	1.14	1.41	20.00
14.31	1.36	5	6.82	1.30	1.50	20.00
16.77	1.51	6	6.32	1.46	1.87	20.00

REINFORCED EARTH

04/28/20

JOB NUMBER :18631 DESIGNED : MS COMMENTS: Case 03

MASS STABILITY AND MAXIMUM BEARING PRESSURE - LRFD STATIC , RANKINE'S THEORY

H = 24.76ft, H'(active zone) = 24.76ft, B = 18.00ft

OHIO -LRFD DESIGN TYPE : LEVEL SURCHARGE

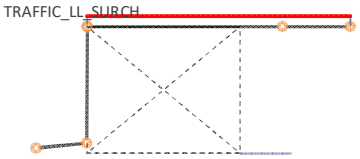
Equiv. height Traffic Live Load Surcharge= 2.08ft or 0.25Ksf. Equiv. height Train/Crane Surch. 0.00ft or 0.00Ksf @ 0.00ft clear from panel & over 0.00ft width

Coeff. Active Earthpressure= Ka =0.3333

Foundation,Coeff. of friction@ bott/wall=0.58, Cohesion=0.00Ksf, Tributary width= 9.84ft

f*= Coefficient of apparent friction @finished grade = 2.00

Select Fill γ=0.120Kcf, Φ=34.00˚, Rand. Fill γ=0.120Kcf, Φ=30.00˚, Rand.Cohes=0.00Ksf -



STATIC MASS STABILITY -FACTORED

VERTICAL LOADS (Kips)		Arm (ft)	Moment (Kip-ft)	
53.48		9.00	481.3	
0.00	53.48	18.00	0.0	481.33
0.00		18.00	0.0	
0.00		0.00	0.0	
0.00	Crane/Footg weight	9.00	0.0	
0.00	VertComp.Pa	18.00	0.0	
0.00	VertComp.Ps	18.00	0.0	
0.00	VertComp.Ppsv	18.00	0.00	
53.48			481.33	

FACTORED HORIZONTAL LOADS, RANKINE'S THEORY

18.39	HorizCompontPa	8.25	151.8	Soil
3.61	HorizCompontPs	12.38	44.6	Traffic LiveLoad
0.00	HorizComp.Ppsv	12.38	0.0	Train/Crane Surch
22.00			196.42	

CAPACITY/DEMAND RATIO (**CDR**)

1) OVERTURNING	2.45	>=1.0, OK
2) SLIDING	1.40	>=1.0, OK

Bearing Pressure

STATIC MASS STABILITY -FACTORED VERTICAL LOAI			Arm (ft)	MOMENT (Kip-ft)		
1.35DL	1.00DL	1DL +0.0LL		1.35DL	1.00DL	1DL +0.0LL
72.20	53.48	53.48	9.00	649.8	481.3	481.3
0.00	0.00	0.00	18.00	0.0	0.0	0.0
0.00	0.00	0.00	18.00	0.0	0.0	0.0
7.86	7.86	0.00	9.00	70.8	70.8	0.0
80.06	61.34	53.48		720.6	552.1	481.3

HORIZONTAL LOADS (SAME AS FOR MASS STABILITY, static case)

1.35DL factor, Eccent. = 2.45ft<= B/ 3.00 =6.00ft, OK, Factored Bearing Pressure = 6.11Ksf

1.00DL, Eccent. = 3.20ft<= B/ 3.00 =6.00ft, Factored BP = 5.29Ksf

1.00DL+0.0 LL, Eccent. = 3.67ft<= B/ 3.00 =6.00ft, OK, Factored BP = 5.02Ksf

Unfactored Bearing Pressure @ toe of wall = 4.25Ksf

REINFORCED EARTH INTERNAL STABILITY SUMMARY - Coherent Gravity Method LargeRectangPanel

Steel Strips

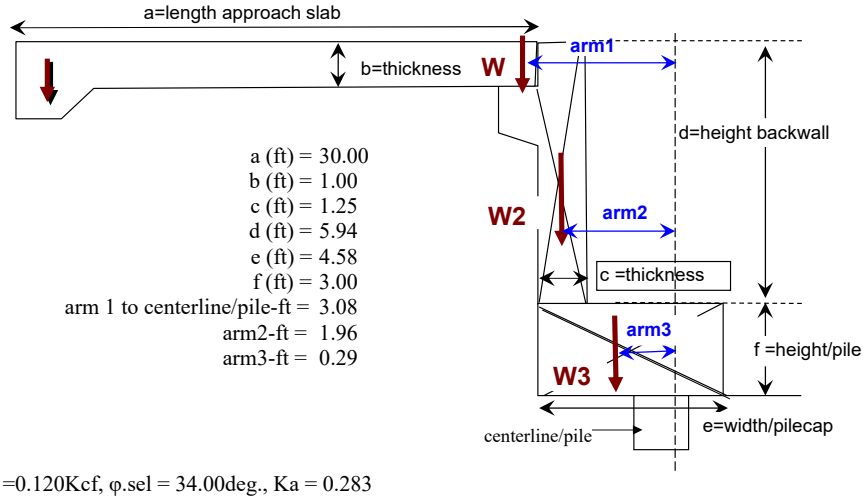
LEVEL	Factored Horiz. Stress σ_h @ Fac'g -Ksf	Density Strips 50x4mm	Factored Tension <= 7.50Kips	Factored Stress σ_h (Bond)-Ksf	Effective Length CDR >=1.0	Reinforc. Length	Minimum Density Req'd
2.000	0.32	3	2.62	0.14	1.25	18.00ft	(2.40)
3.850	0.44	3	3.55	0.26	1.20	18.00ft	(2.50)
6.310	0.58	3	4.71	0.41	1.12	18.00ft	(2.68)
8.770	0.72	3	5.81	0.56	1.04	18.00ft	(2.90)
11.230	0.85	4	5.13	0.70	1.25	18.00ft	(3.19)
13.690	0.97	4	5.88	0.83	1.20	18.00ft	(3.33)
16.150	1.09	4	6.60	0.96	1.18	18.00ft	(3.52)
18.610	1.21	4	7.31	1.08	1.10	18.00ft	(3.90)
21.070	1.36	5	6.60	1.25	1.31	18.00ft	(4.40)
23.530	1.60	6	6.44	1.49	1.62	18.00ft	(5.16)

JOB NUMBER :18631
JOB NAME : OC3
COMMENTS : Rear Abutment

DESIGNED : MS
DATE : 12/23/2020

3

LRFD Method - STRENGTH I



a (ft) = 30.00
b (ft) = 1.00
c (ft) = 1.25
d (ft) = 5.94
e (ft) = 4.58
f (ft) = 3.00
arm 1 to centerline/pile-ft = 3.08
arm2-ft = 1.96
arm3-ft = 0.29

Select Backf'l =0.120Kcf, φ.sel = 34.00deg., Ka = 0.283
Equivalent height of LL Surcharge =2.08ft
Height Of Abutment = 8.94, Abutment Length = 18.83ft, Strip Skew Angle = 0.0 deg
Height Of Pile Cap = 3.00, Height Of Bearing Pad = 0.10ft
Steel Strips, f* = Apparent Coefficient Of Friction (Bond)=2.000 @ top, f*min at 20ft depth = 0.675

FACTORED VERTICAL FORCES (Kips per ft)

		ARM	STABILIZING MOMENT
W1=	2.25	3.08	6.93
W2=	1.11	1.96	2.18
W3=	2.06	0.29	0.60
			9.71 Kip-ft/ft

FACTORED HORIZONTAL FORCES (Kips per ft)

		ARM	OVERTURNING MOMENT
HORIZONTAL FORCE FROM BRIDGE	3.82	3.10	11.84
EARTHPRESSURE Ps	0.98	3.97	3.89
EARTHPRESSURE Pa	1.60	2.65	4.25
SUM H =	6.41		19.98

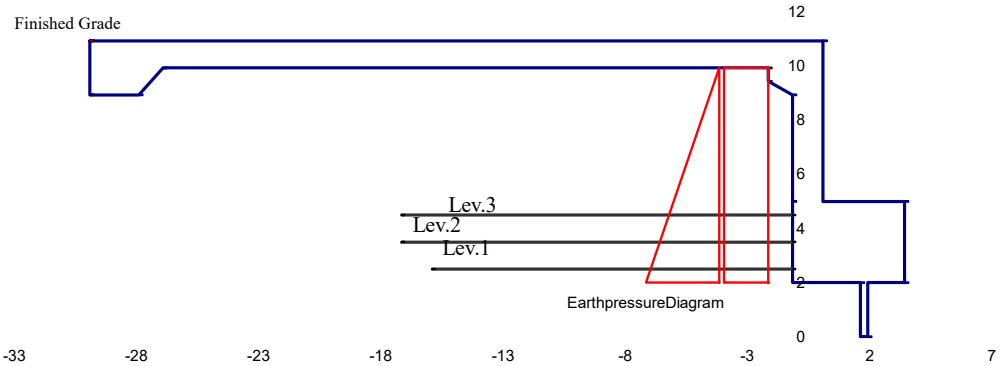
LOCATION/RESULTANT OF HORIZONTAL FORCES FROM BOTTOM/ABUTM.SEAT = 3.12 f
TOTAL HORIZONTAL FORCE ON BRIDGE ABUTMENT = 120.61 Kips
TOTAL NET OVERTURNING MOMENT = 193.51Kip-ft

STATIC

Steel Strips, f* = Apparent Coefficient Of Friction (Bond)=2.000 @ top, f*min at 20ft depth = 0.675

Level	1 (Bottom)		2		3	
Distance to Bottom/Pile Cap - ft =	0.50		1.50		2.50	
f* @ Reinf.Strip Level =	1.44		1.51		1.57	
Number of Strips requ'd(pcs) =	**8**	@ 2.55ft O.C.	**8**	@ 2.55ft O.C.	**8**	@ 2.55ft O.C.
Strip Length (ft) =	16.000	ft	16.000	ft	16.000	ft
Leff. =	15.71	ft	15.13	ft	14.56	ft
FACTORED RESISTANCE IN FRICTION =	54.14	Kips	48.08	Kips	41.79	Kips
CDR PULL OUT =	1.35	**>=1.0, O.K.**	1.20	**>=1.0, O.K.**	1.04	**>=1.0, O.K.**
FACTORED Tension in Reinforcing Strip=	5.03	Kips<=7.50Kips, OK	5.03	Kips<=7.50Kips, ok	5.03	Kips<=7.50Kips, ok
RESISTING MOMENT STRENGTH =	27.07	Kip-ft	72.13	Kip-ft	104.49	Kip-ft
Total Resisting Moment STRENGTH =	203.68	Kip-ft , O.K.				

LOCATION/RESULTANT OF STRAP FORCES FROM BOTTOM/ABUTM.SEAT = 1.41ft



Level 2, 8 strips, 16ft long
Level 1, 8 strips, 16ft long

KOKOSING CONSTRUCTION

- ☐ NO EXCEPTIONS TAKEN
- ☑ MAKE CORRECTIONS AS NOTED
- ☐ REVISE AND RESUBMIT
- ☐ REJECTED
- ☐ FOR INFORMATION ONLY

REVIEW IS FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS
NO RESPONSIBILITY ASSUMED FOR CORRECTNESS OF DIMENSIONS OR DETAILS

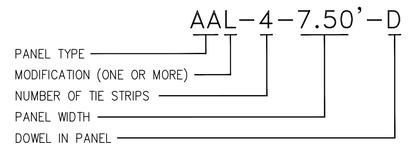
BY obluestone **DATE** 6/18/2020

REINFORCED EARTH®
45610 Woodland Road, Suite 200, Sterling VA 20166 (703) 547-8797
www.reinforcedearth.com

THE PRECASTER SHALL BE: NORWALK CONCRETE INDUSTRIES, NORWALK, OH

PANEL GENERAL NOTES

1) REINFORCING BARS SHALL BE ASTM A615 GRADE 60, EPOXY COATED PER ASTM A775.
2) CONCRETE FOR PRECAST PANELS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AFTER 28 DAYS OF 4000 p.s.i., OR AS REQUIRED BY THE PROJECT SPECIAL PROVISIONS.
3) TIE STRIPS SHALL BE STEEL ASTM 1011, GRADE 50 (GALVANIZED PER ASTM A-123).
4) ALL FRONT EDGES OF PANELS SHALL HAVE A 1/2" CHAMFER.
5) TIE STRIPS SHALL BE PLACED WITHIN 1" OF THE DIMENSION SHOWN ON THE FABRICATION DRAWINGS.
6) PANEL DESIGN THICKNESS IS 5 1/2". THE QUANTITY OF CONCRETE WILL INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
7) VERTICAL REINFORCING BARS SHALL BE PLACED 1 1/2" (MIN.) CLEAR FROM THE BACK FACE OF THE PANEL.
8) ALL REINFORCING BARS SHALL BE STOPPED 1 1/2" (MIN.) CLEAR FROM ANY EDGE OF PANEL UNLESS NOTED ON INDIVIDUAL FABRICATION DRAWING.
9) ALL INDIVIDUAL FABRICATION DRAWINGS ARE SHOWN BACK FACE.
10) IF COPING DOWELS ARE REQUIRED, USE 2'-0" LONG, SIX (6) PER FULL-WIDTH PANEL.
11) KEY TO PIECE MARK:



SHEET INDEX	
SHEET NO.	DRAWING NAME
1	GENERAL NOTES
2	STANDARD PRECAST PANEL SHOP DRAWING "DETAILS"
3	STANDARD HORIZONTAL SECTIONS
4	STANDARD VERTICAL SECTIONS
5	STANDARD PANEL REINFORCEMENTS
6	PRECAST PANEL SHOP DRAWINGS
7	PRECAST PANEL SHOP DRAWINGS
8	PRECAST PANEL SHOP DRAWINGS
9	PRECAST PANEL SHOP DRAWINGS "CE5"

PANEL TOLERANCES	
PANEL DIMENSIONS	± 1/8 INCH (3mm)
PANEL SQUARENESS (DIFFERENCE BETWEEN TWO DIAGONALS)	± 1/4 INCH (6mm)
PANEL THICKNESS	± 1/8 INCH (3mm)
LOCATION OF SOIL REINFORCEMENT CONNECTION DEVICE	± 1/4 INCH (6mm)
PANEL SURFACE (SIZE OF SURFACE DEFECT MEASURED OVER A LENGTH OF 5 FT (1.5 M)) SMOOTH FORMED FINISH TEXTURED FINISH	 ± 1/8 INCH (3mm) ± 5/16 INCH (8mm)
POSITION OF REINFORCING STEEL	± 1/8 INCH (3mm)

REAR ABUTMENT MSE WALL AT EAST 89TH ST.

CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

The design contained on these drawings is based on information provided by the Owner. On the basis of this information, The Reinforced Earth Company has designed, and is responsible for the internal stability of the structure only. External stability, including foundation (bearing capacity and settlement) and global stability (including sliding and rotation), is the responsibility of the Owner.

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

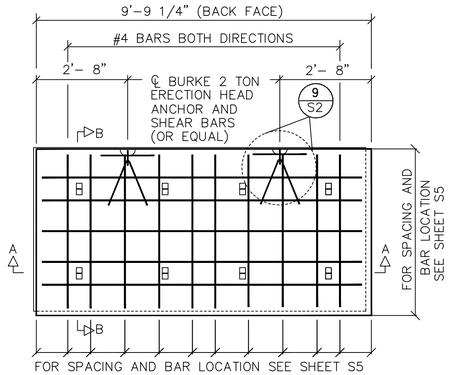
DATE: 04/27/2020 | PID No: 96833
REVIEWED: MS | DRAWN: NR | REVISED:
DESIGNED: MS | CHECKED: MS

GENERAL NOTES
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

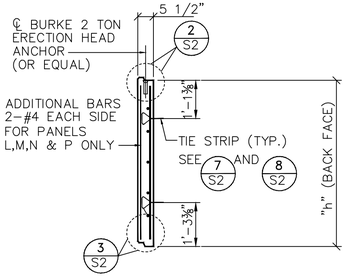
18631

R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Shops\18631 SHOP.dwg



ELEVATION – BACK FACE

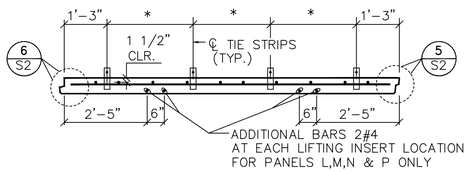
NOTE:
FOR STANDARD TIE STRIP SPACING, SEE SHEETS S3 AND S4.



SECTION B–B

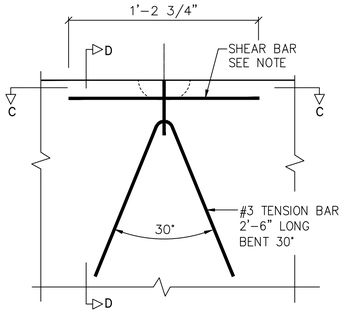
PANEL TYPE	"h"
A/H	4'–10 1/4"
C	1'–9 1/2"
B/D	2'–4 3/4"
E	3'– 0 1/4"
F	3'–7 1/2"
G	4'–3"
K	5'–5 3/4"
L/P	6'–1"
M	6'–8 1/2"
N	7'–3 3/4"

NOTE:
CONCRETE COVER ON ALL REINFORCEMENT TO BE 1 1/2" MIN.

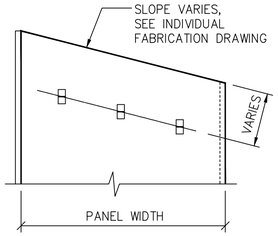


* FOR TIE STRIP SPACING SEE SHEET S3

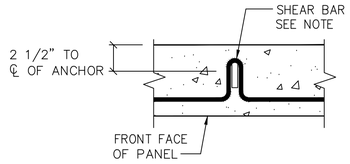
SECTION A–A
SCALE: 1/2" = 1'–0"



9 S2 TENSION BAR DETAIL

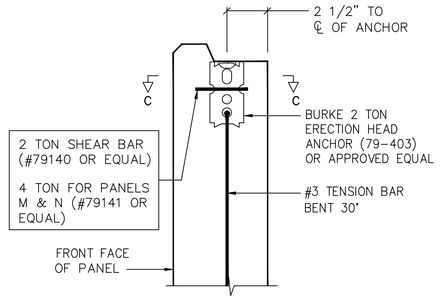


SLOPE TOP PANELS

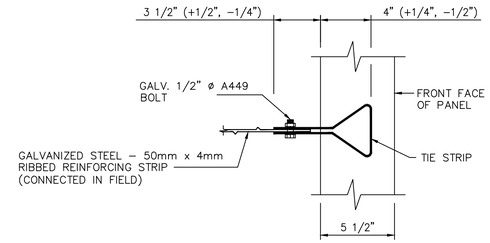


SECTION C–C

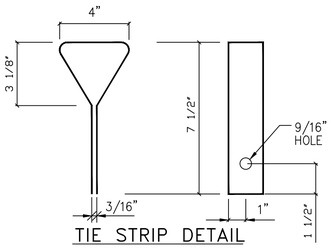
NOTE:
SHEAR BAR AS PROVIDED BY BURKE (OR EQUAL) FOR USE WITH 2 TON (OR 4 TON FOR M & N PANELS), TWO HOLE, ERECTION HEAD ANCHOR SHEAR BAR #79140.



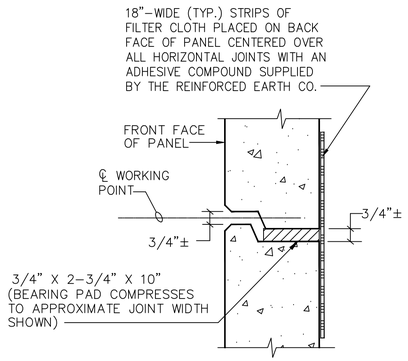
SECTION D–D
ERECTION HEAD
SCALE 3"=1'



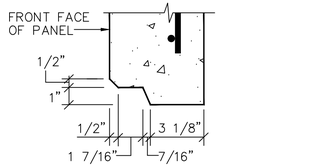
CONNECTION DETAIL



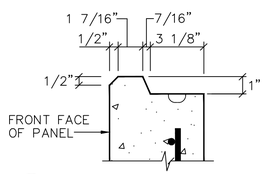
TIE STRIP DETAIL
SCALE 3"=1'–0"



1 S2 HORIZONTAL JOINT
SCALE: 3"=1'–0"

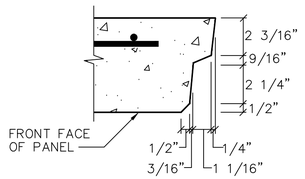


3 S2 SECTION @ PANEL BOTTOM
SCALE: 3"=1'–0"

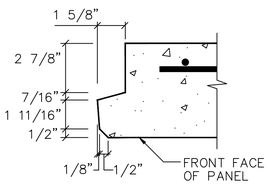


2 S2 SECTION @ PANEL TOP
SCALE: 3"=1'–0"

HORIZONTAL JOINT



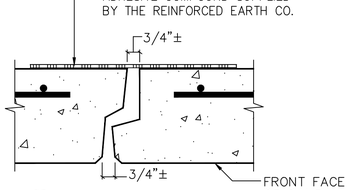
5 S2 SECTION @ PANEL RIGHT SIDE OF SECTION A–A
SCALE: 3"=1'–0"



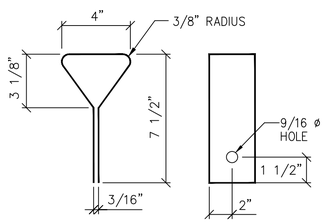
6 S2 SECTION @ PANEL LEFT SIDE OF SECTION A–A
SCALE: 3"=1'–0"

VERTICAL JOINT

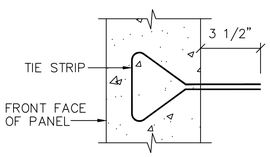
12"–WIDE (TYP.) STRIPS OF FILTER CLOTH PLACED ON BACK FACE OF PANEL CENTERED OVER ALL VERTICAL JOINTS WITH AN ADHESIVE COMPOUND SUPPLIED BY THE REINFORCED EARTH CO.



4 S2 VERTICAL JOINT
SCALE: 3"=1'–0"
(LOOKING UP PANEL)



8 S2 4" TIE STRIP DETAIL
RECO PART #: TS4WG
SCALE 3"=1'–0"



7 S2 SECTION TIE STRIP EMBEDDED IN PANEL
SCALE: 3"=1'–0"

VERTICAL JOINT

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CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

DATE: 04/27/2020
REVIEWED: MS
PID No: 96833
DRAWN: NR
REVISED:
DESIGNED: MS
CHECKED: MS

STANDARD PRECAST PANEL SHOP DRAWING "DETAILS"
CUY–IR490/SR010–2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY–IR490
SR010–2.09/19.28

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18631

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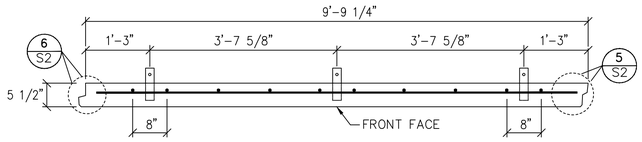
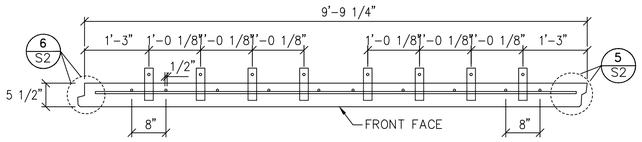
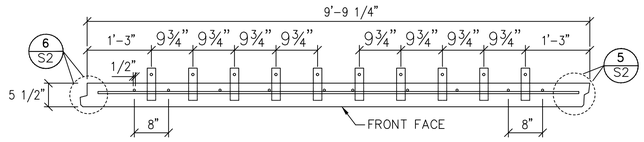


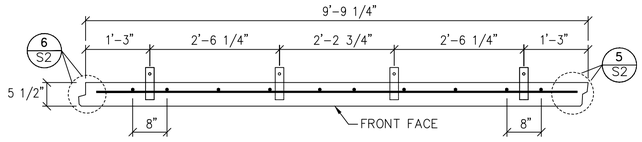
HORIZONTAL SECTION W/3 TIE STRIPS



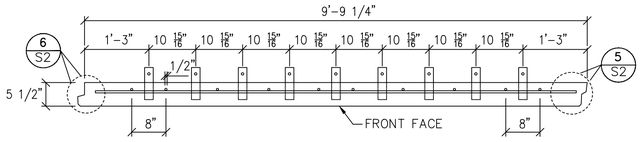
HORIZONTAL SECTION W/8 TIE STRIPS



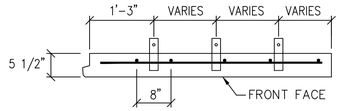
HORIZONTAL SECTION W/10 TIE STRIPS



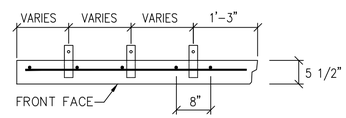
HORIZONTAL SECTION W/4 TIE STRIPS



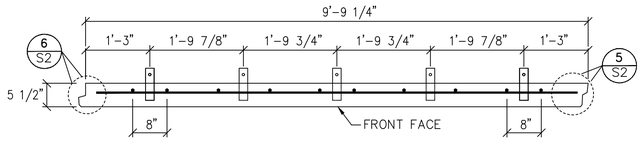
HORIZONTAL SECTION W/9 TIE STRIPS



HORIZONTAL SECTION
LEFT CUT PANEL
(LOOKING UP PANEL)

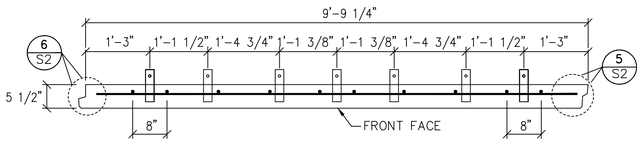


HORIZONTAL SECTION
RIGHT CUT PANEL
(LOOKING UP PANEL)

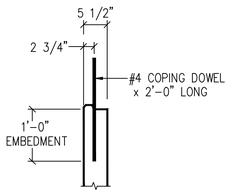


HORIZONTAL SECTION W/5 TIE STRIPS

HORIZONTAL SECTION W/6 TIE STRIPS

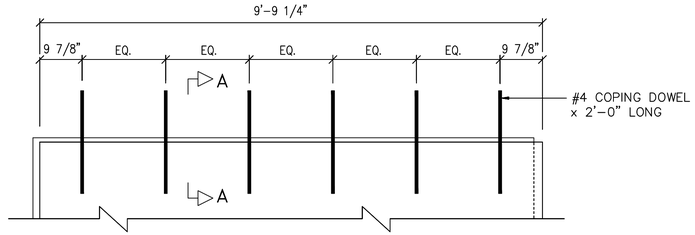


HORIZONTAL SECTION W/7 TIE STRIPS



SECTION A–A
AT TOP W/DOWELS

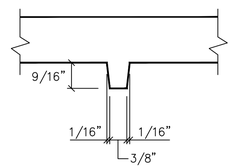
NOTE:
USE EITHER STANDARD PANEL WITH LIP
(AS SHOWN) OR FLAT TOP WITH FORM HEADER
WHEN USING COPING DOWELS.



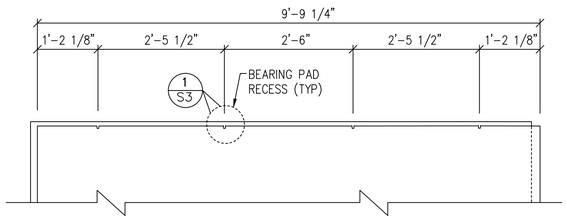
COPING DOWEL DETAILS
(BACK FACE)

NOTE:

1) ALL HORIZONTAL AND VERTICAL REBAR SHOWN IS #4, UNLESS OTHERWISE NOTED ON THE INDIVIDUAL PANEL DETAILS.



1 S3 BEARING PAD RECESS



BEARING PAD DETAIL

Bearing Recess necessary? Bearings called out to be flat 3/4" X 2 - 3/4 " X 10" pads

CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

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ReINFORCED eARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DESIGNED: MS
DRAWN: NR
CHECKED: MS
REVIEWED: MS
DATE: 04/27/2020
REVISED:
PID No: 96833

STANDARD HORIZONTAL SECTIONS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

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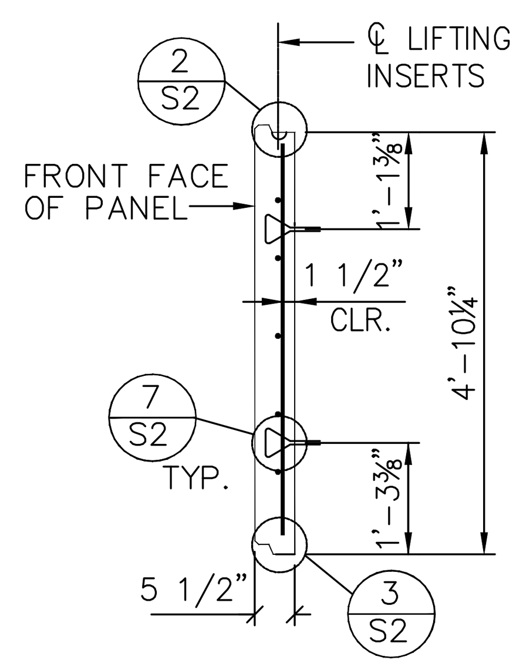
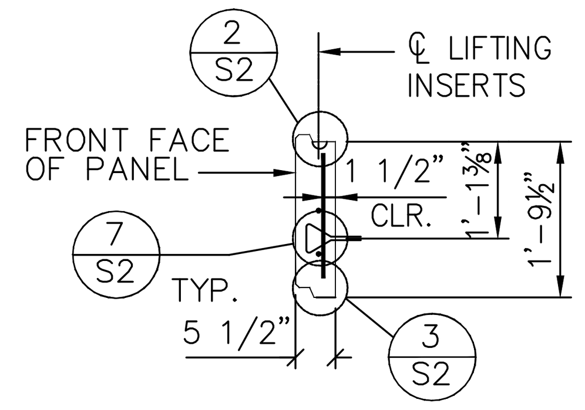
18631

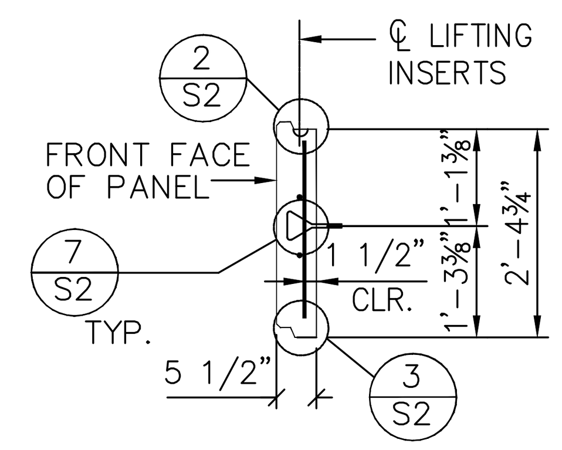
R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Shops\18631 SHOP.dwg



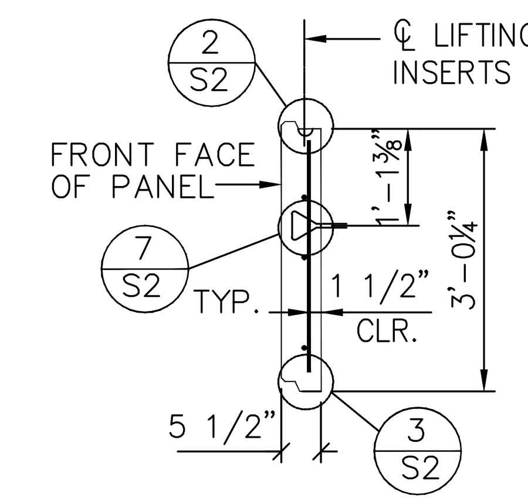
1 S4 SECTION B-B PANEL "A/H"



3 S4 SECTION B-B PANEL "C"

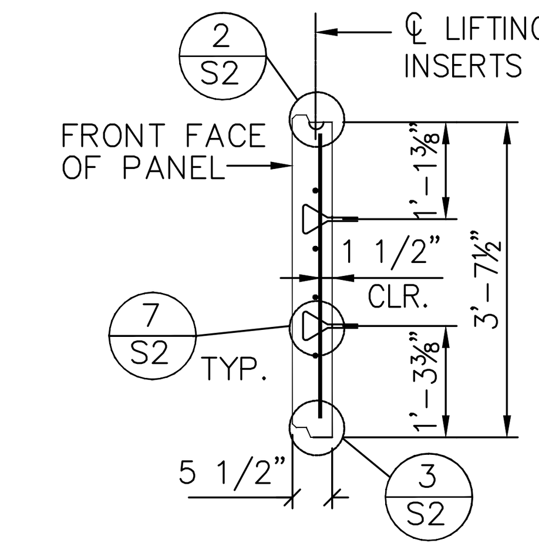


2 S4 SECTION B-B PANEL "D/B"

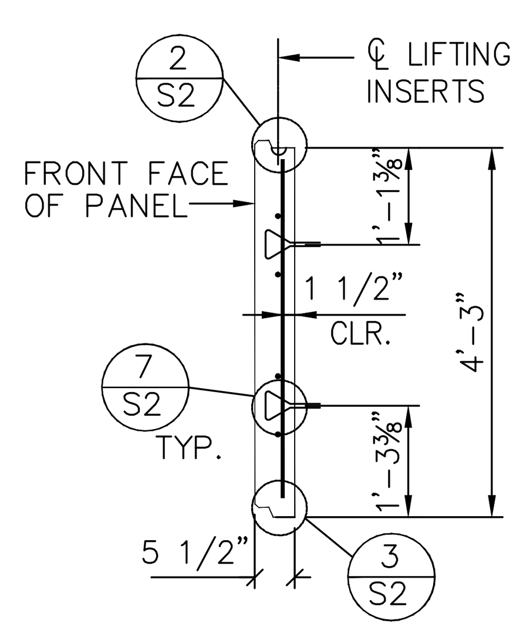


4 S4 SECTION B-B PANEL "E"

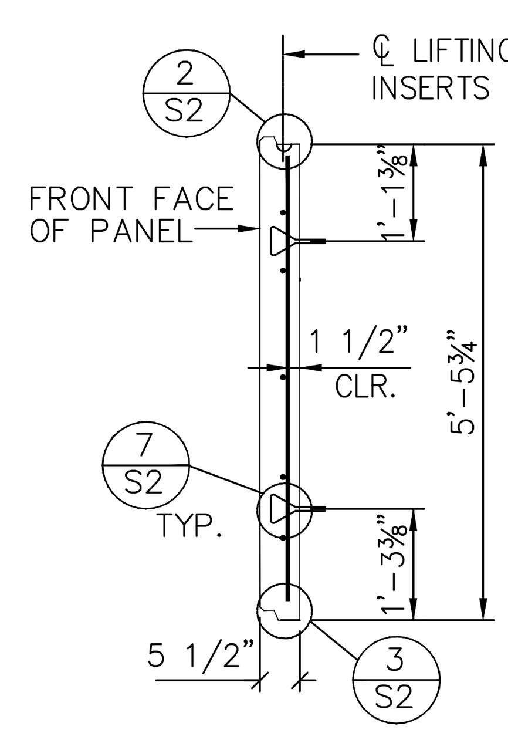
"TOP PANEL ONLY"



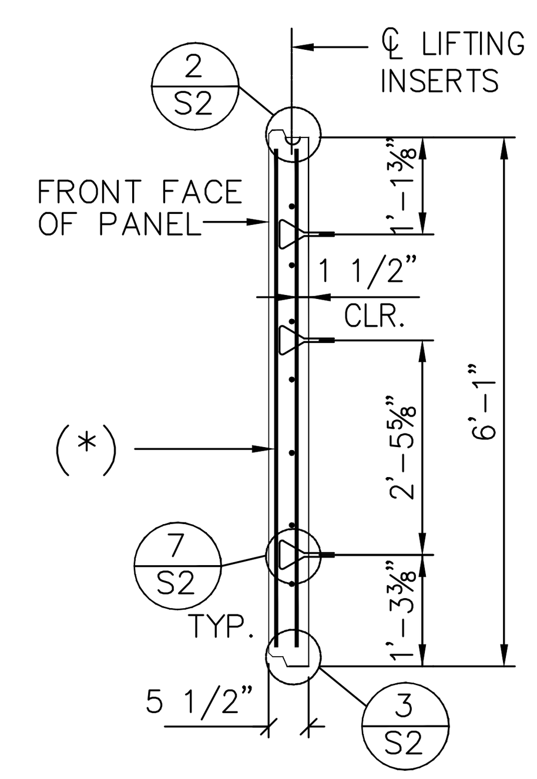
5 S4 SECTION B-B PANEL "F"



6 S4 SECTION B-B PANEL "G"

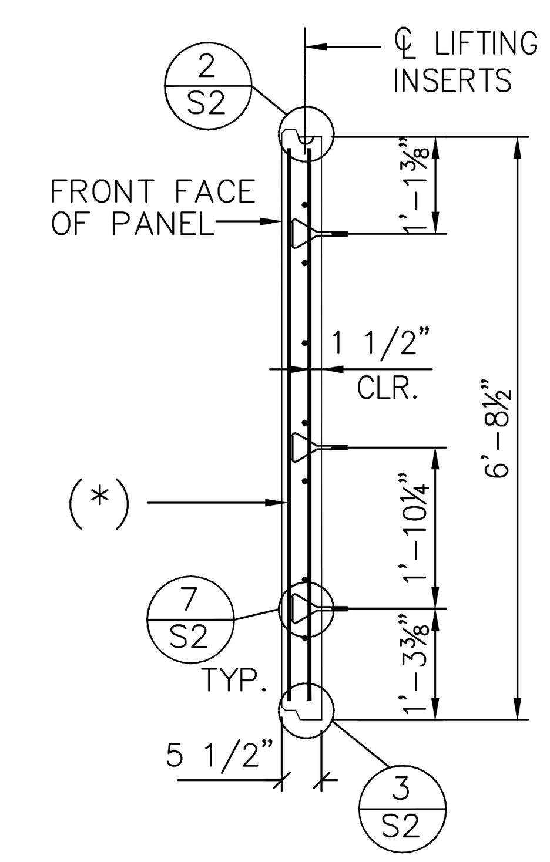


7 S4 SECTION B-B PANEL "K"



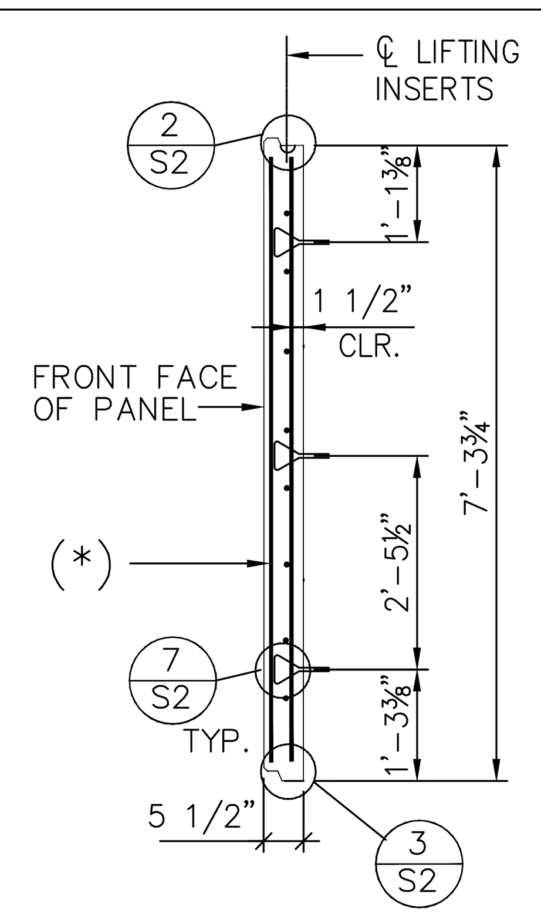
8 S4 SECTION B-B PANEL "L"

* ADDITIONAL BARS 2#4 AT EACH LIFTING INSERT LOCATION



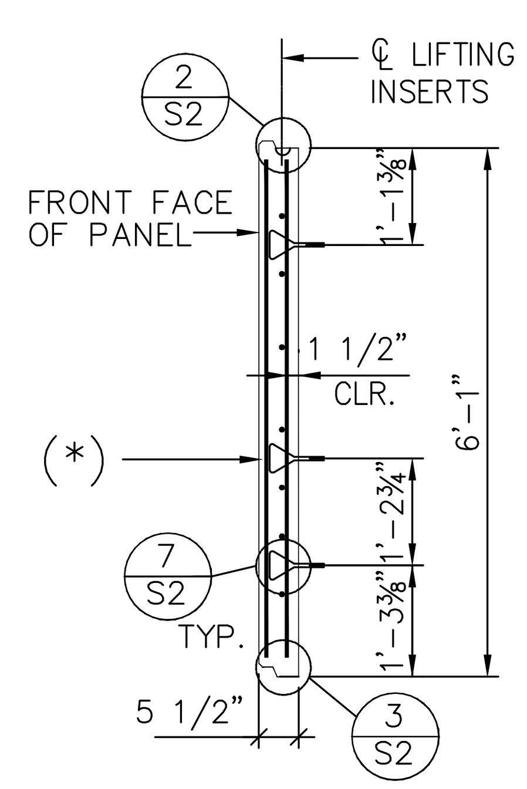
9 S4 SECTION B-B PANEL "M"

* ADDITIONAL BARS 2#4 AT EACH LIFTING INSERT LOCATION



10 S4 SECTION B-B PANEL "N"

* ADDITIONAL BARS 2#4 AT EACH LIFTING INSERT LOCATION



11 S4 SECTION B-B PANEL "P"

"BOTTOM PANEL ONLY"

* ADDITIONAL BARS 2#4 AT EACH LIFTING INSERT LOCATION

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CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83188
REGISTERED PROFESSIONAL ENGINEER

6/4/20

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

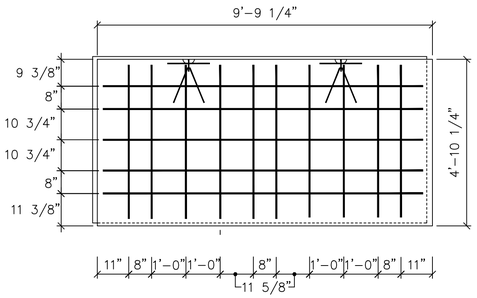
DATE: 04/27/2020	PID No: 96833
REVIEWED: MS	
DRAWN: NR	REVISED:
DESIGNED: MS	CHECKED: MS

STANDARD VERTICAL SECTIONS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

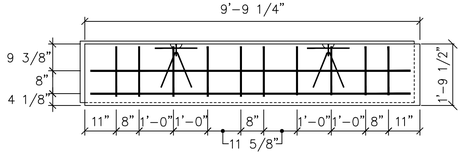
CUY-IR490
SR010-2.09/19.28

18631

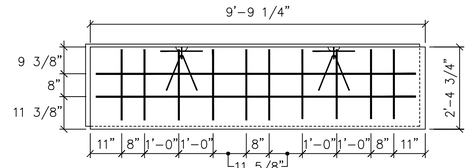
R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Shops\18631 SHOP.dwg



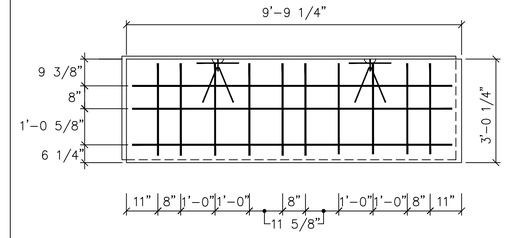
PANEL A/H



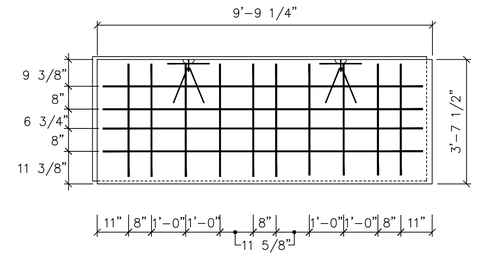
PANEL C



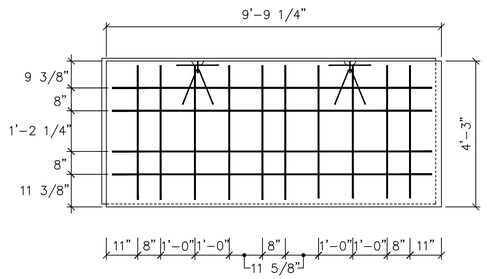
PANEL D/B



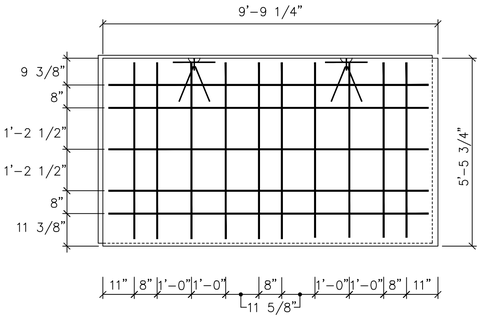
PANEL E
"TOP PANEL ONLY"



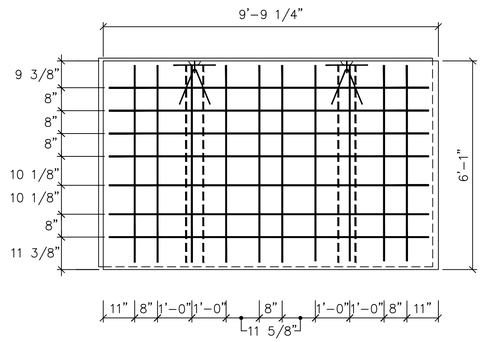
PANEL F



PANEL G

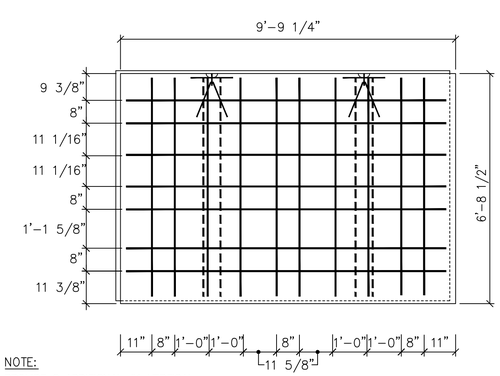


PANEL K



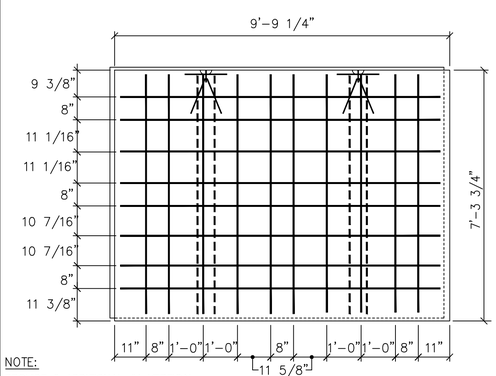
PANEL L

NOTE:
PROVIDE 2 ADDITIONAL #4 VERTICAL BARS AT EACH LIFTING INSERT NEAR FRONT FACE FOR HANDLING.



NOTE:
PROVIDE 2 ADDITIONAL #4 VERTICAL BARS AT EACH LIFTING INSERT NEAR FRONT FACE FOR HANDLING.

PANEL M



NOTE:
PROVIDE 2 ADDITIONAL #4 VERTICAL BARS AT EACH LIFTING INSERT NEAR FRONT FACE FOR HANDLING.

PANEL N

The design contained on these drawings is based on information provided by the Owner. On the basis of this information, The Reinforced Earth Company has designed, and is responsible for the internal stability of the structure only. External stability, including foundation (bearing capacity and settlement) and global stability (including sliding and rotation), is the responsibility of the Owner.

CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83198
REGISTERED PROFESSIONAL ENGINEER
6/4/20

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

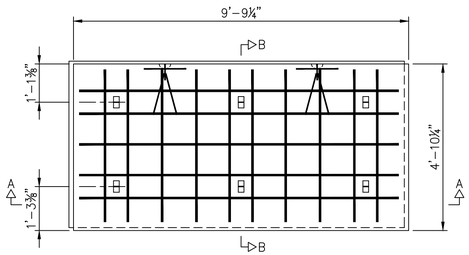
DESIGNED: MS | DRAWN: NR | REVIEWED: MS | DATE: 04/27/2020
CHECKED: MS | REVISED: | PID No: 96833

STANDARD PANEL REINFORCEMENTS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

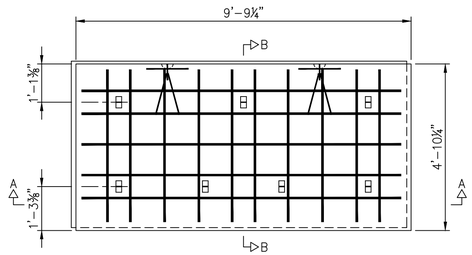
CUY-IR490
SR010-2.09/19.28

18631

R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Shops\18631 SHOP.dwg



A-6



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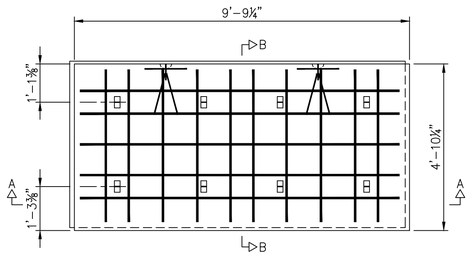

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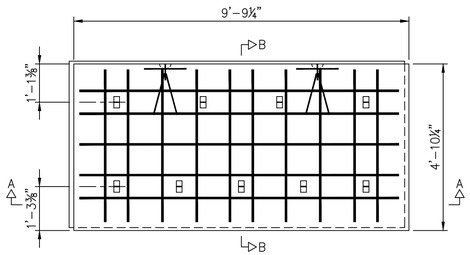

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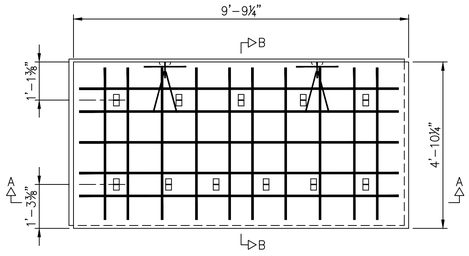

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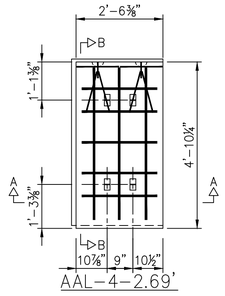
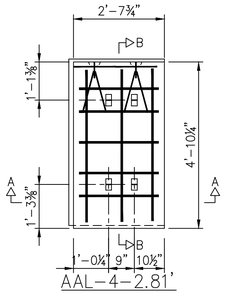


AAL-4-2.69'



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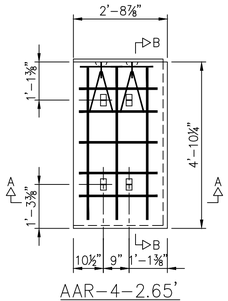
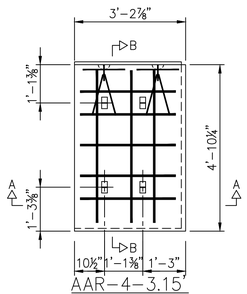
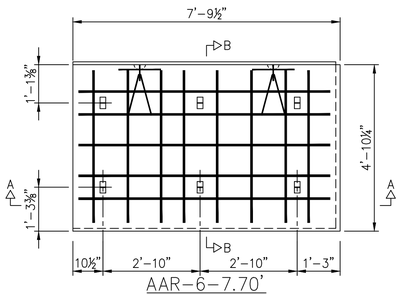


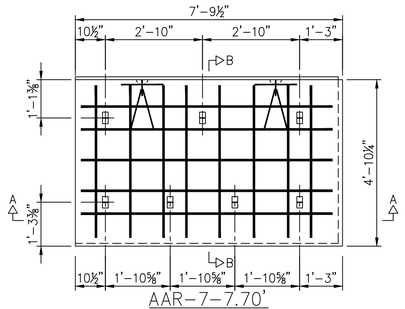
AAR-4-2.65'



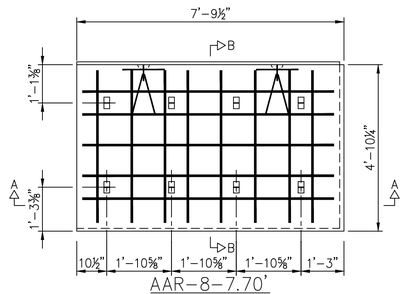
AAR-4-3.15'



AAR-6-7.70'



AAR-7-7.70'



AAR-8-7.70'

NOTE: FOR SECTIONS A-A AND B-B REFER TO SHEETS S2, S3 AND S4.

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STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83195
REGISTERED
PROFESSIONAL ENGINEER

6/4/20

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DESIGNED: MS	DRAWN: NR	REVIEWED: MS	DATE: 04/27/2020
CHECKED: MS	REVISED:		PID No: 96833

PRECAST PANEL SHOP DRAWINGS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

18631

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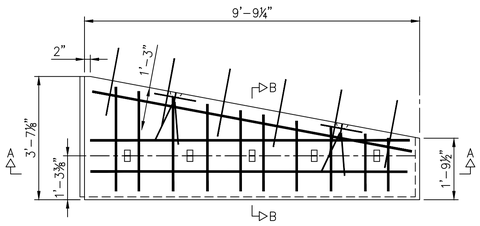
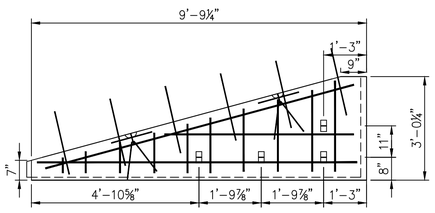
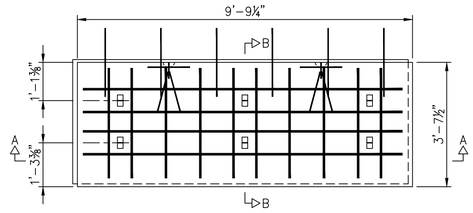


CF-5-D



E2X-4-D



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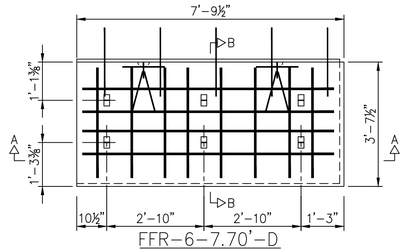
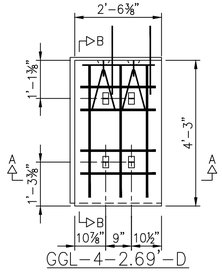
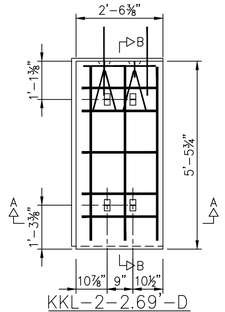


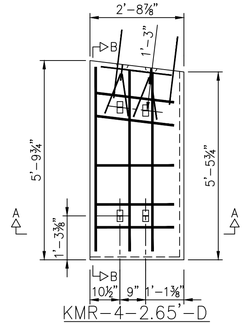
FFR-6-7.70'-D



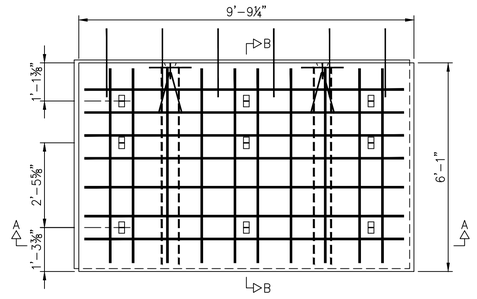
GGL-4-2.69'-D



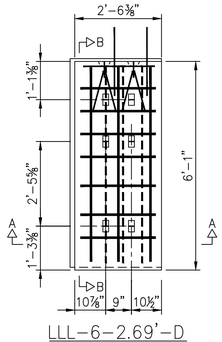
KKL-2-2.69'-D



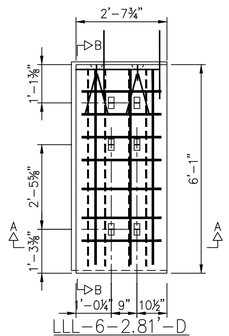
KMR-4-2.65'-D



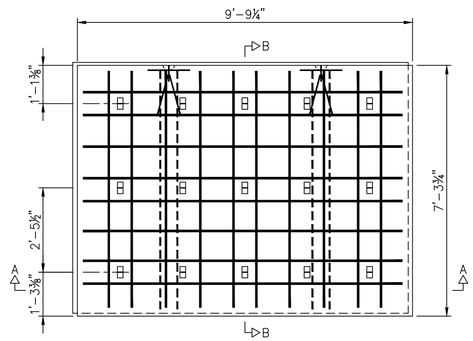
L-9-D



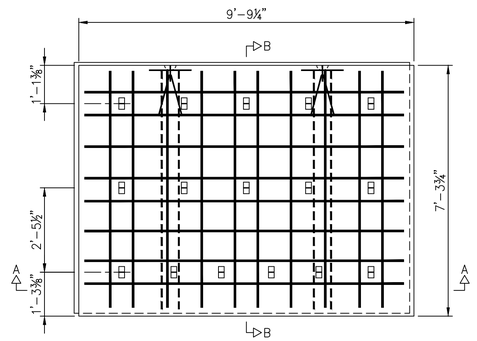
LLL-6-2.69'-D



LLL-6-2.81'-D



N-15



N-16

NOTE: FOR SECTIONS A-A AND B-B REFER TO SHEETS S2, S3 AND S4.

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CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83198
REGISTERED
PROFESSIONAL ENGINEER
6/4/20

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

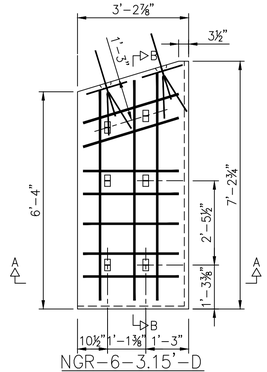
DESIGNED: MS | DRAWN: NR | REVIEWED: MS | DATE: 04/27/2020
CHECKED: MS | REVISED: | PID No: 96833

PRECAST PANEL SHOP DRAWINGS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

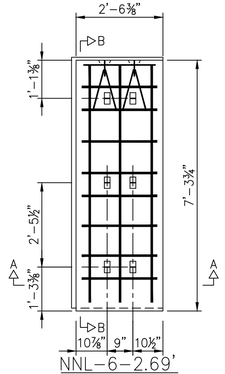
CUY-IR490
SR010-2.09/19.28

18631

R:\RE18631_RLA_OH_CUY-IR 490\2nd Structure (2020-04-23) Rear Abut. At E. 89th St\Shops\18631 SHOP.dwg



NGR-6-3.15'-D



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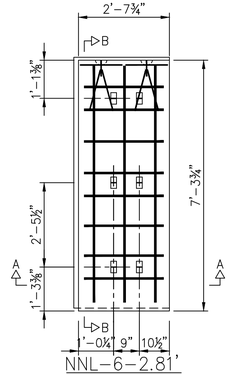

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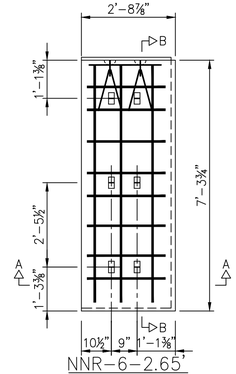

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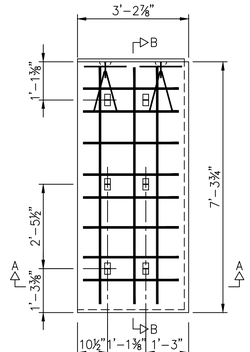

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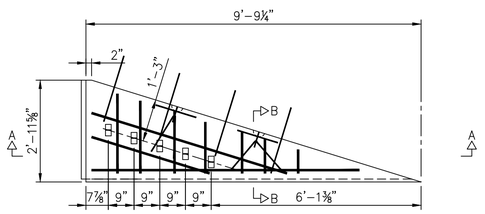
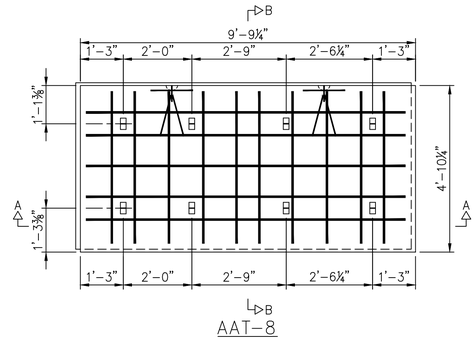
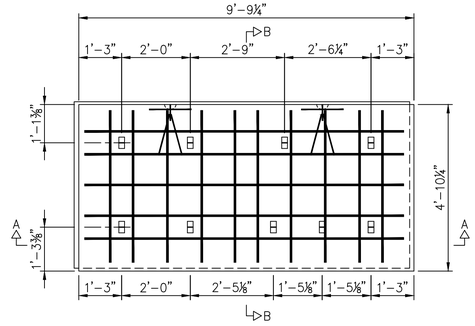


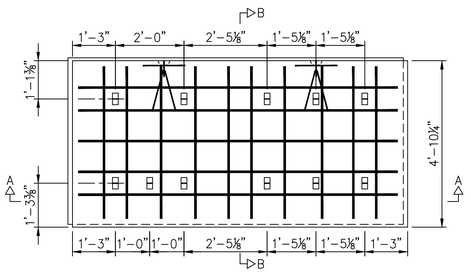
VE-5-D



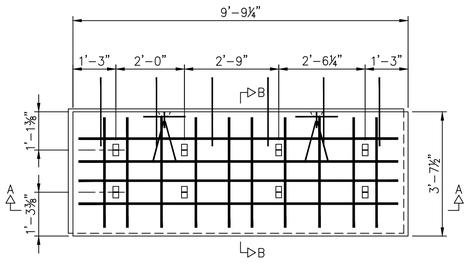
AAT-8



AAT-9



AAT-11



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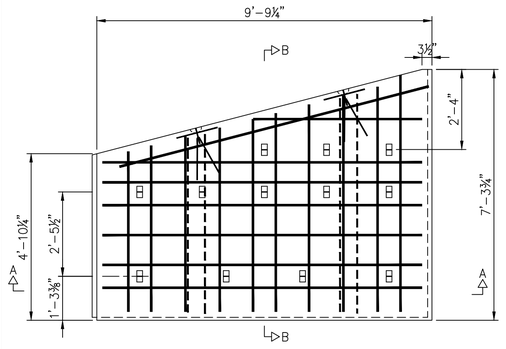
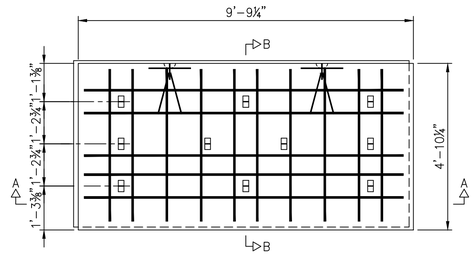


NH-12



AAT-10

NOTE: FOR SECTIONS A-A AND B-B REFER TO SHEETS S2, S3 AND S4.

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STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83198
REGISTERED
PROFESSIONAL ENGINEER
6/4/20

REINFORCED EARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DESIGNED:	DRAWN:	REVIEWED:	DATE:
MS	NR	MS	04/27/2020

CHECKED:	REVISED:	PID No:
MS		96833

PRECAST PANEL SHOP DRAWINGS
CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

CUY-IR490
SR010-2.09/19.28

18631

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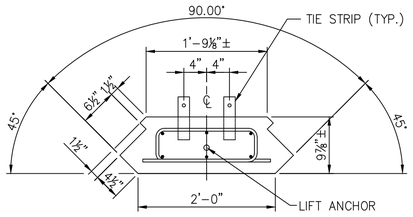
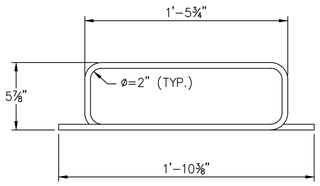
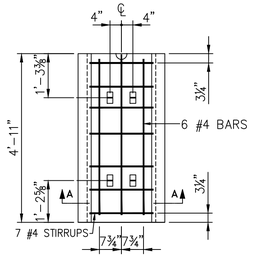


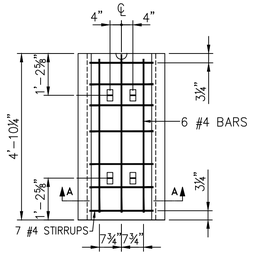
SECTION A–A



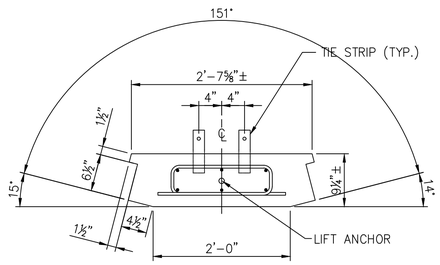
STIRRUP DETAIL
(DIMENSIONS SHOWN ARE OUT TO OUT)



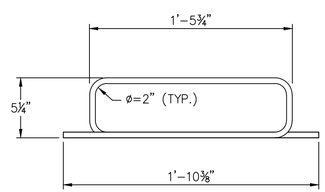
CE5X90–4–R3
BACK FACE VIEW



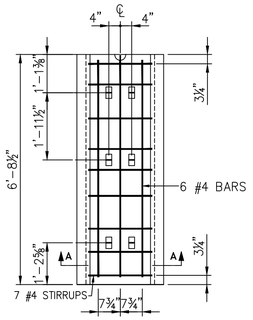
CE5A90–4–R3
BACK FACE VIEW



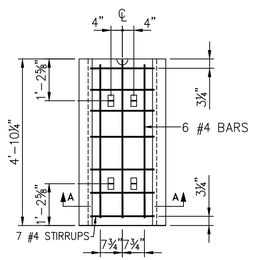
SECTION A–A



STIRRUP DETAIL
(DIMENSIONS SHOWN ARE OUT TO OUT)



CE4M151–4–R3
BACK FACE VIEW



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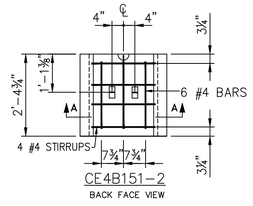
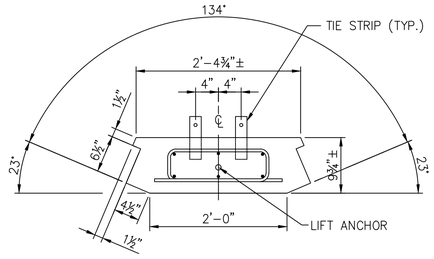
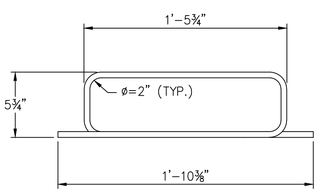
BACK FACE VIEW



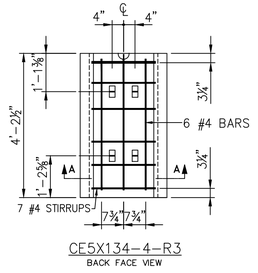
CE4B151–2
BACK FACE VIEW



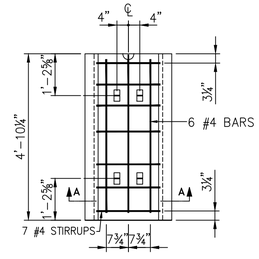
SECTION A–A



STIRRUP DETAIL
(DIMENSIONS SHOWN ARE OUT TO OUT)



CE5X134–4–R3
BACK FACE VIEW



CE5A134–4–R3
BACK FACE VIEW

The design contained on these drawings is based on information provided by the Owner. On the basis of this information, The Reinforced Earth Company has designed, and is responsible for the internal stability of the structure only. External stability, including foundation (bearing capacity and settlement) and global stability (including sliding and rotation), is the responsibility of the Owner.

CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF REINFORCED EARTH STRUCTURES ONLY.

STATE OF OHIO
CONSTANCE ANNE ARNOLD
E-83785
REGISTERED
PROFESSIONAL ENGINEER
6/4/20

ReINFORCED eARTH®
45610 Woodland Rd., Suite 200, Sterling, VA 20166

DESIGNED: MS
DRAWN: NR
REVIEWED: MS
CHECKED: MS
REVISED:
DATE: 04/27/2020
PID No: 96833

PRECAST PANEL SHOP DRAWINGS "CE5"
CUY–IR490/SR010–2.09/19.28
CITY OF CLEVELAND, CUYAHOGA COUNTY, OHIO
OHIO DEPARTMENT OF TRANSPORTATION

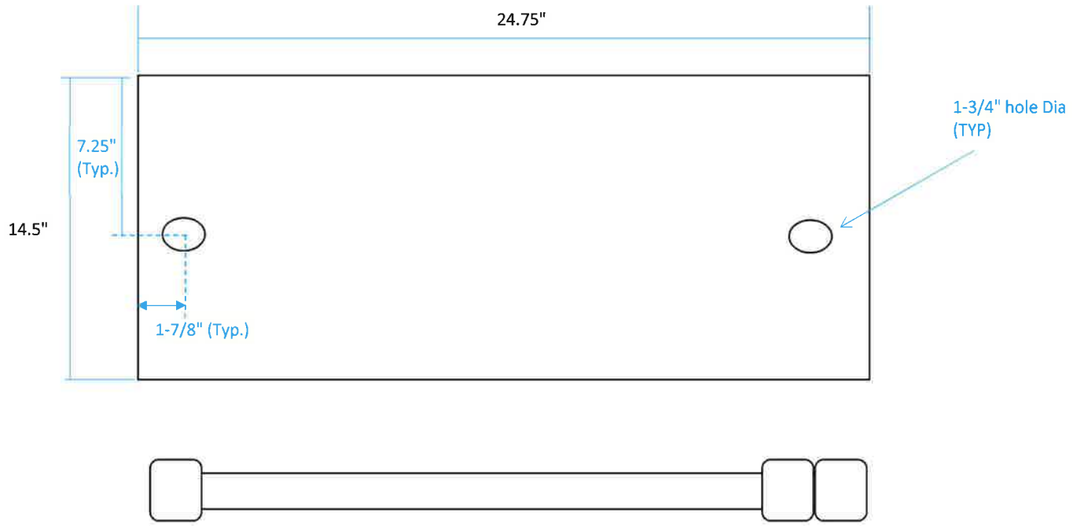
CUY–IR490
SR010–2.09/19.28

09 OF 9

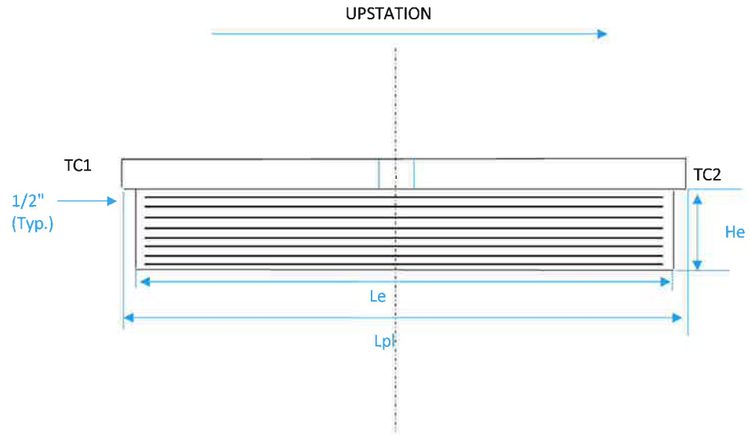
18631

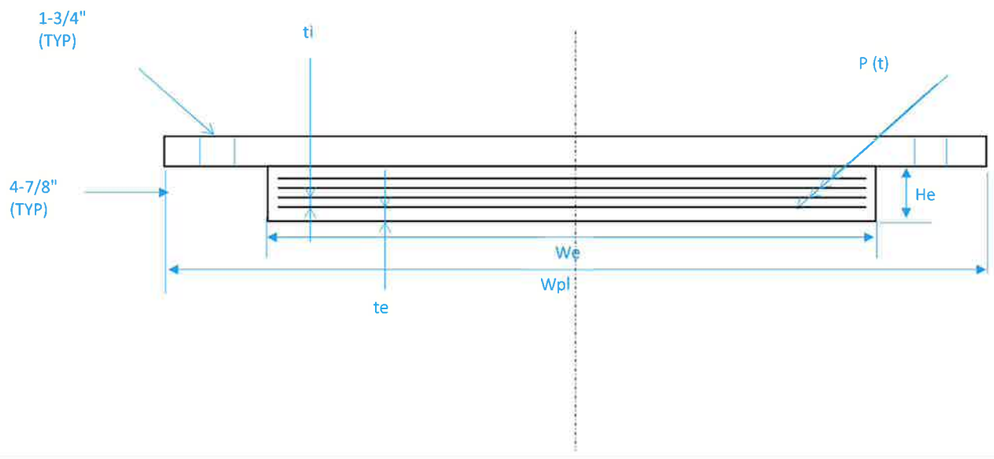
R:\RE18631_RLA_OH_CUY–IR 490\2nd Structure (2020–04–23) Rear Abut. At E. 89th St\Shops\18631 SHOP.dwg

Checked By:	NS
Drawn By:	BS



2'-2" long 1-1/2" threaded anchor rod galv. with three ASTM A563 Nuts and washers. ASTM F1554 Grade 105





Contractor to verify dimensions.
Steel load plate shall be ASTM A709 grade 50W steel and shall have the same protective coating as the main structrual steel. Sherwin Williams Zinc Clad Plus 2 system to be used in prime paint.
Elastomeric bearings: The elastomer shall have a hardness of 50 durometer. The bearings were designed under section 14.7.6 (Method A) of the AASHTO LRFD design specifications.
All bearings shall be marked prior to shipping. The marks shall include the bearing location on the bridge and a direction arrow that points up-station. All marks shall be permanent and shall be visible after the bearing is installed.
Anchor rods shall be ASTM F1554, Grade 105. Nuts shall conform to ASTM A563 for appropriate grade and size of anchor bolt. washer shall conform to ASTM F436.

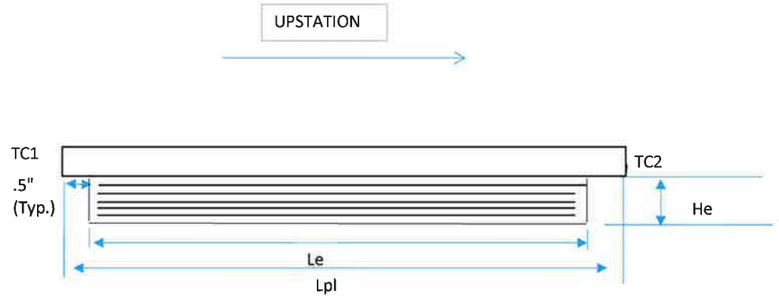
P = Number of Steel Laminates per Bearing
t= steel laminate thickness = 0.0747"
te = external elastomer layer thickness (1 ea.)
ti = internal elastomer layer thickness (4 ea.)

BEARING LOCATION	NO. REQ'D	Le	We	He	te	ti	P	Lpl	Wpl	Ts	TC1	TC2
Pier 1	3	13.5"	15"	2.65"	.35"	.50"	4	14.5"	24.75"	1.5"	1.2912"	1.7088"

BRIDGE COMPONENTS INDUSTRIES, LLC

CONTRACTOR:	SHS
COUNTY:	Cuyahoga
Bridge #:	BU-25
PROJECT:	ODOT 3000-17
Date:	10/21/2020
Drawing Number	BU25 Bro
Page	1 of 2

Checked By	Neil Spears
Drawn By	Brodie Spears



\Contractor to verify dimensions.
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P = Number of Steel Laminates per Bearing
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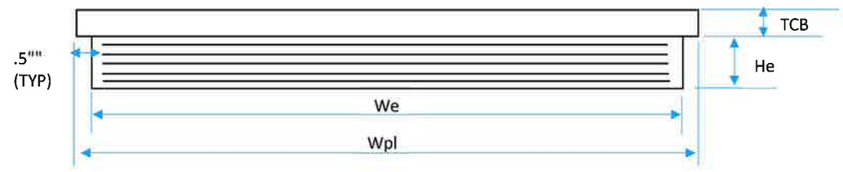


BEARING LOCATION	NO. REQ'D	Le	We	He	te	ti	P	Lpl	Wpl	Ts	TC1	TC2			
RA	3	11"	11"	2.07"	.35"	.5"	3	12"	12"	1-1/2"	1.3272"	1.6728"			
FA	3	11"	11"	3.22"	.35"	.5"	5	12"	12"	1-1/2"	1.7772"	1.2228"			
Pier 2	3	13.5"	15"	2.65"	.35"	.5"	4	14.5"	16"	1-1/2"	1.7660"	1.2339"			

BRIDGE COMPONENTS INDUSTRIES, LLC

CONTRACTOR:	SHS
COUNTY:	Cuyahoga
Bridge #:	BU-25
PROJECT:	ODOT 3000-17
Date:	10/21/2020
Drawing Number	BU25 Bro
Page	2 of 2

GENERAL SHOP NOTES

SPECIFICATIONS:

ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE STATE OF OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATION (CMS) DATED 2016, CONTRACT DWGS AND SPECIAL PROVISIONS.

THIS STRUCTURE CONFORMS TO THE "LRFD BRIDGE DESIGN SPECIFICATIONS" ADOPTED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS, 7TH EDITION, INCLUDING THE 2016 INTERIM SPECIFICATIONS AND THE ODOT BRIDGE DESIGN MANUAL, 2007.

MATERIALS:

ALL MATERIAL (EXCEPT HARDWARE) SHALL BE ASTM A709 GR 50W.

BEAMS AND FIELD SPLICE PLATES REQUIRE CHARPY V-NOTCH (CVN) TESTING PER CMS 711.01.

"DOR" DENOTES DIRECTION OF ROLLING

PROCEDURE FOR CAMBERING:

1. CHECK FOR NATURAL CAMBER WITHIN THE ROLLED STRUCTURAL BEAM AS RECEIVED FROM THE MILL.

2. LAY THE ROLLED STRUCTURAL BEAM INTO THE CAMBERING MACHINE WITH THE WEB HORIZONTAL AND PUSH ON THE NATURAL CAMBER SIDE (CONCAVE SIDE).

3. STARTING AT THE MID-POINT OF THE STRUCTURAL BEAM, PUSH APPROXIMATELY $\frac{1}{4}$" - $\frac{1}{2}$" CAMBER INTO THE BEAM. THEN MOVE TO THE QUARTER POINT OF THE STRUCTURAL BEAM AND PUSH APPROXIMATELY $\frac{1}{4}$" - $\frac{3}{8}$" CAMBER INTO THE BEAM. NEXT MOVE TO THE EIGHTH POINTS AS NEEDED AND PUSH $\frac{1}{8}$" - $\frac{3}{16}$" ADDITIONAL CAMBER INTO THE BEAM UNTIL THE DESIRED CAMBER IS REACHED. THIS ALTERNATING PUSHING METHOD WILL ASSURE A CAMBER CURVATURE AS REQUIRED AND WILL NOT KINK THE STRUCTURAL ROLLED BEAM.

4. CHECK THE STRUCTURAL ROLLED BEAMS TO SEE IF THE REQUIRED CAMBER IS OBTAINED WHILE THE BEAM IS LAYING WITH THE WEB IN A RELAXED HORIZONTAL POSITION.

WORKMANSHIP:

ALL CORNERS OF OXYGEN CUT EDGES OF MAIN STRESS-CARRYING MEMBERS AND "ALL" OTHER CORNERS EITHER OXYGEN CUT, SHEARED OR SAW CUT (EXPOSED AFTER FIT-UP & WELDING), SHALL HAVE A 1/16" RADIUS OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PER AWS D1.5-2002 SECTION 3.2.9 AND CMS 513.12.

SHOP STRAIGHTEN AS NECESSARY BOTTOM FLANGE IN "BRG AREA" TO PROVIDE A UNIFORM CONTACT BETWEEN THE BEAM FLANGE AND THE BRG AT THE BRIDGE SEAT (SEE BEAM DETAILS FOR LOCATION OF "BRG AREA").

WELDING:

IN ACCORDANCE WITH AASHTO/AWS BRIDGE WELDING CODE (D1.5 2010) AS AMENDED BY CMS 513.21 AND SUPPLEMENT 1011.

WELD PROCEDURE SPECS:	CONN PL TO BEAM WEB	WPS	10 - 3
	CONN PL TO BEAM FLG	WPS	10 - 4
	CROSSFRAME CENTER PL	WPS	10 - 10

NON DESTRUCTIVE TESTING:

NONE.

BOLTS:

ASTM F3125 GR. A325 TYPE 3 BOLTS IN UNPAINTED AREAS, TYPE 1 HOT-DIP GALV. IN PAINTED AREAS PER CMS 711.02 & 711.09

ROTATIONAL-CAPACITY TESTS ARE REQUIRED.

BOLTS SHALL BE 1"ø H.S.B. (W/ $1\frac{1}{16}$"ø HOLE) FOR FIELD SPLICE PLATES AND $\frac{5}{8}$"ø H.S.B. WITH $\frac{13}{16}$"ø HOLES IN THE CROSS FRAME ANGLES AND $\frac{11}{16}$"ø HOLES IN THE CONNECTION PLATES.

STUDS:

FIELD APPLIED (BY OTHERS)

CLEANING:

PAINTED STEEL:
ABRASIVE BLAST ALL STEEL TO BE PAINTED ACCORDING TO SSPC-SP10 AND AS SHOWN ON THE PICTORIAL SURFACE PREPARATION STANDARDS FOR PAINTING STEEL SURFACES SHOWN IN SSPC-VIS 1. BEFORE ABRASIVE BLASTING, STEEL SHALL BE SOLVENT CLEANED PER SSPC-SP1 AND EXPOSED EDGES OF THE BEAMS SHALL BE ROUNDED TO A RADIUS OF 1/8 ± 1/16 INCH. (PER CMS 514.13)

UNPAINTED STEEL:
SHOP BLAST UNPAINTED STEEL TO SSPC-SP6, COMMERCIAL BLAST. BEFORE SHOP BLAST SOLVENT CLEAN WHERE NECESSARY. (PER CMS 513.28)

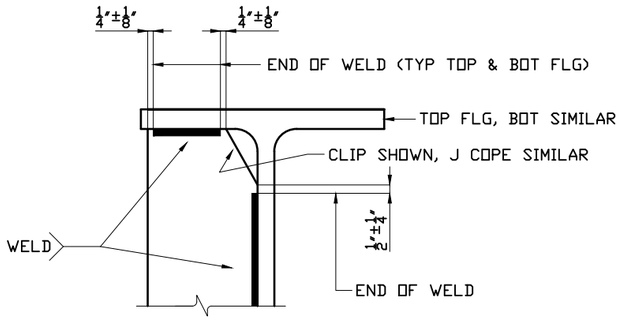
PAINTING:

NO PAINT UNLESS NOTED "PAINT" ON DRAWINGS.

PAINTED MEMBERS AND AREAS TO RECEIVE INORGANIC ZINC SILICATE PRIMER PAINT ONLY PER CMS 514.17. PRIMER SHALL CONFORM TO 708.01.

APPLY "MIST COAT PRIMER ONLY" (0.5 TO 1.5 MILS) WHERE SHOWN ON DETAILS.

PRIMER PAINT: CARBOLINE 11HS GREEN



DETAIL A

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING _____
PRIMER _____
INTERMEDIATE _____
FINISH _____
TO SHOP:

SFI
SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

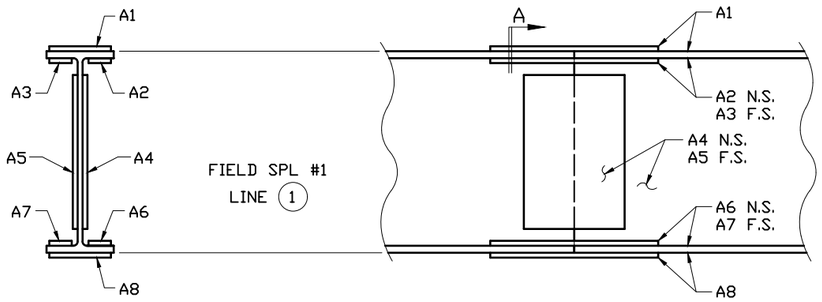
GENERAL NOTES
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 _____
2 _____
3 _____
4 _____

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. _____ DATE _____

DWG. NO. GN1AB
CONT. NO. 19-782

GENERAL SHOP NOTES



SECTION A

MATCH MARK SYSTEM

FS#1	FS#2
LINE - (1), FIELD SPL #1, USE - A	LINE - (1), FIELD SPL #2, USE - B
LINE - (2), FIELD SPL #1, USE - C	LINE - (2), FIELD SPL #2, USE - D
LINE - (3), FIELD SPL #1, ETC.	LINE - (3), FIELD SPL #2, ETC.

FIELD SPLICES:

HOLES MARKED [RA] SHALL BE SUBPUNCHED/SUBDRILLED 1/4"Ø UNDERSIZE AND REAMED TO FULL SIZE OR DRILLED FULL SIZE FROM THE SOLID, WITH STRINGER AND SPLICE PLATES ASSEMBLED AND MATCH MARKED USING MIN. STRESS STAMPS PER CMS 513.19 & 513.24.

SFI FIELD SPLICE PROCEDURE:

SPLICE PL'S SHALL HAVE THE FOUR CORNER HOLES SUBPUNCHED 13/16"Ø IN MATERIAL UP TO AND INCLUDING 5/8" THICK, SUB-DRILL 13/16"Ø HOLES IN MATERIAL OVER 5/8" THICK. BALANCE OF ALL HOLES IN THE N.S. WEB PLATE AND OUTER FLANGE SPLICE PLATES SHALL BE DRILLED FULL SIZE. ONCE ALL SPLICE PLATES ARE INSTALLED ON THE BEAMS IN LAYDOWN, USE THE PREVIOUS FULL SIZE HOLES FOR TEMPLATE AND DRILL BALANCE OF PLIES AT SPLICE FULL SIZE USING AN END CUTTER HOGAN BIT. THE PREVIOUS CORNER SUB-SIZED HOLE TO BE REAMED FULL SIZE.

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING _____
PRIMER _____
INTERMEDIATE _____
FINISH _____

TO SHOP:

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

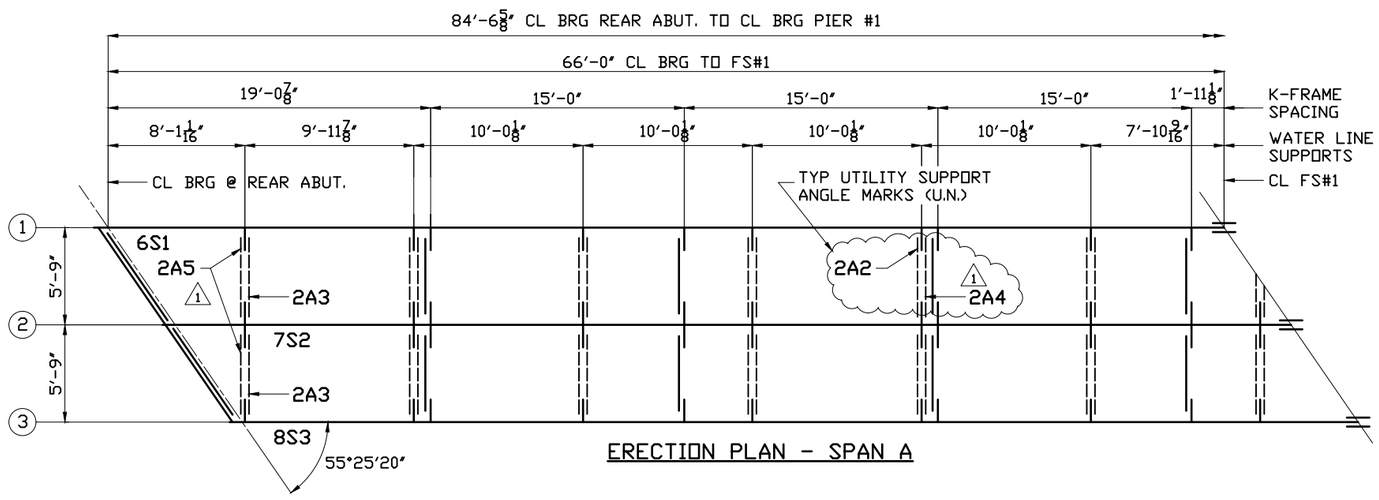
GENERAL NOTES
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 _____
2 _____
3 _____
4 _____

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. _____ DATE _____

DWG. NO. GN1B

CONT. NO. 19-782



ERECTION PLAN - SPAN A

ERECTOR NOTES:

-ALL HORIZONTAL DIMENSIONS SHOWN DO NOT REFLECT GRADE.

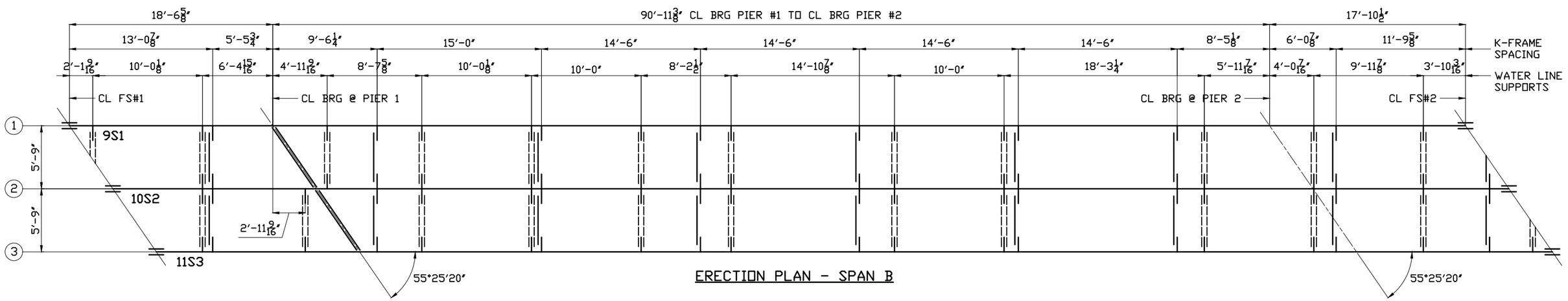
-ALL BEAMS ARE W40x149.

-WORK THIS DWG. WITH DWG'S E2 THRU E5 FOR CROSS FRAME DETAILS AND MARKS NOT SHOWN HERE.

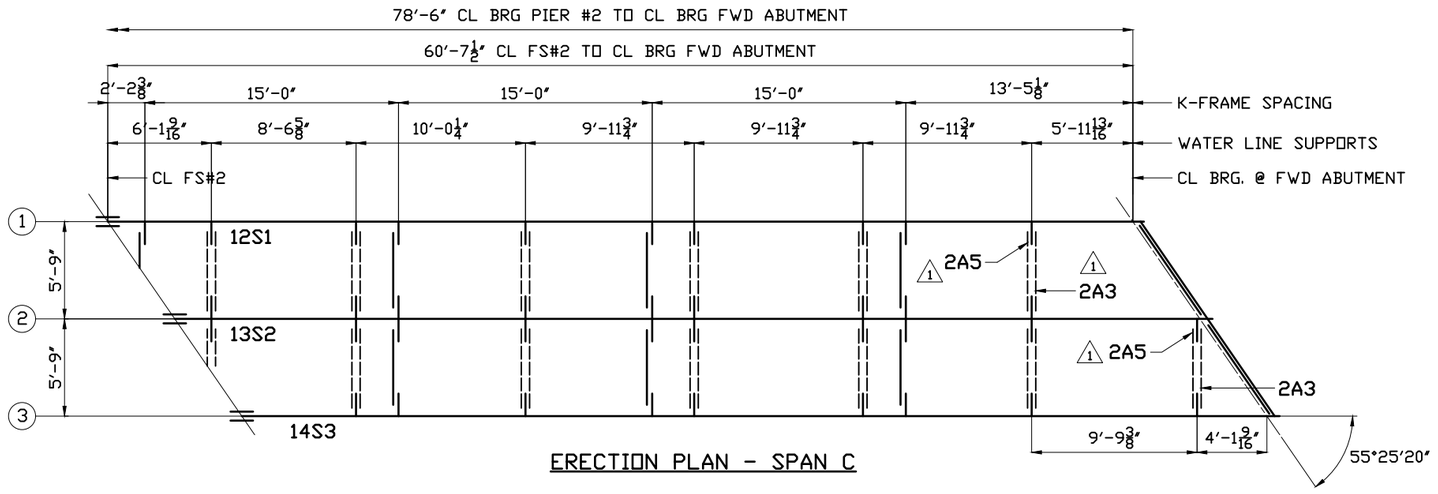
-SEE DWG.'S GN1AB/B FOR GENERAL NOTES.

-SEE DWG. E5 FOR FIELD BOLT SIZES & LOCATIONS.

-SHEAR CONNECTORS, BEARING ITEMS, CONDUITS AND FIELD WELDING ARE NOT BY SFI.



ERECTION PLAN - SPAN B



ERECTION PLAN - SPAN C

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING
PRIMER
INTERMEDIATE
FINISH

TO SHOP:

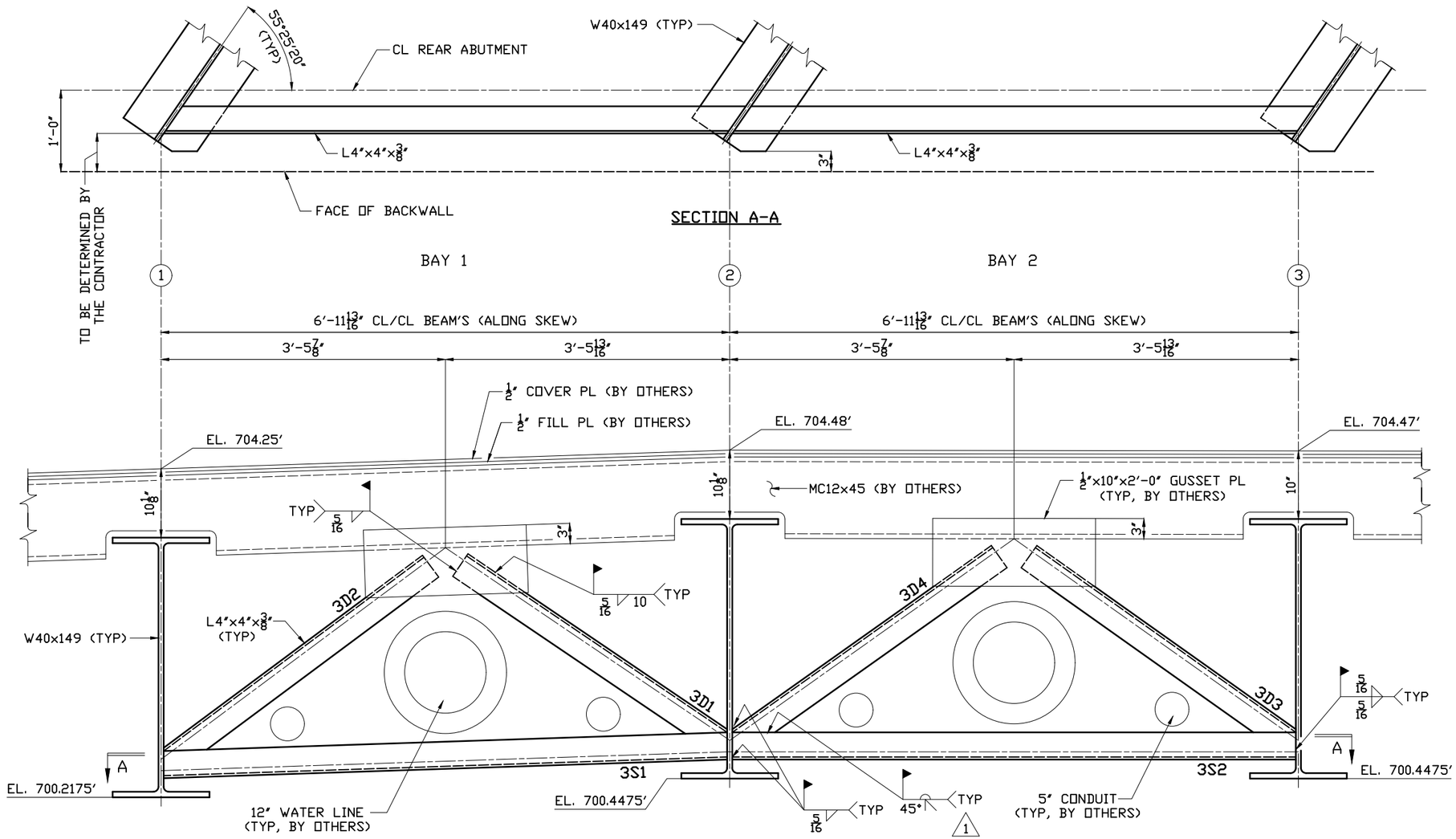
SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

ERECTION PLAN
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS				
1	REVISED MARKS	6/17/20	DR. CCD-MC	DATE 2/2020
2			CH. CCD-JB	DATE 2/2020
3			APP.	DATE
4				

DWG. NO. E1

CONT. NO. 19-782



REAR ABUTMENT CROSSFRAME

LOOKING AHEAD STATIONS

WATERLINE OR ELECTRICAL CONDUITS NOT SHOWN FOR CLARITY AND ARE NOT BY SFI

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING
PRIMER
INTERMEDIATE
FINISH

TO SHOP:

SFI SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

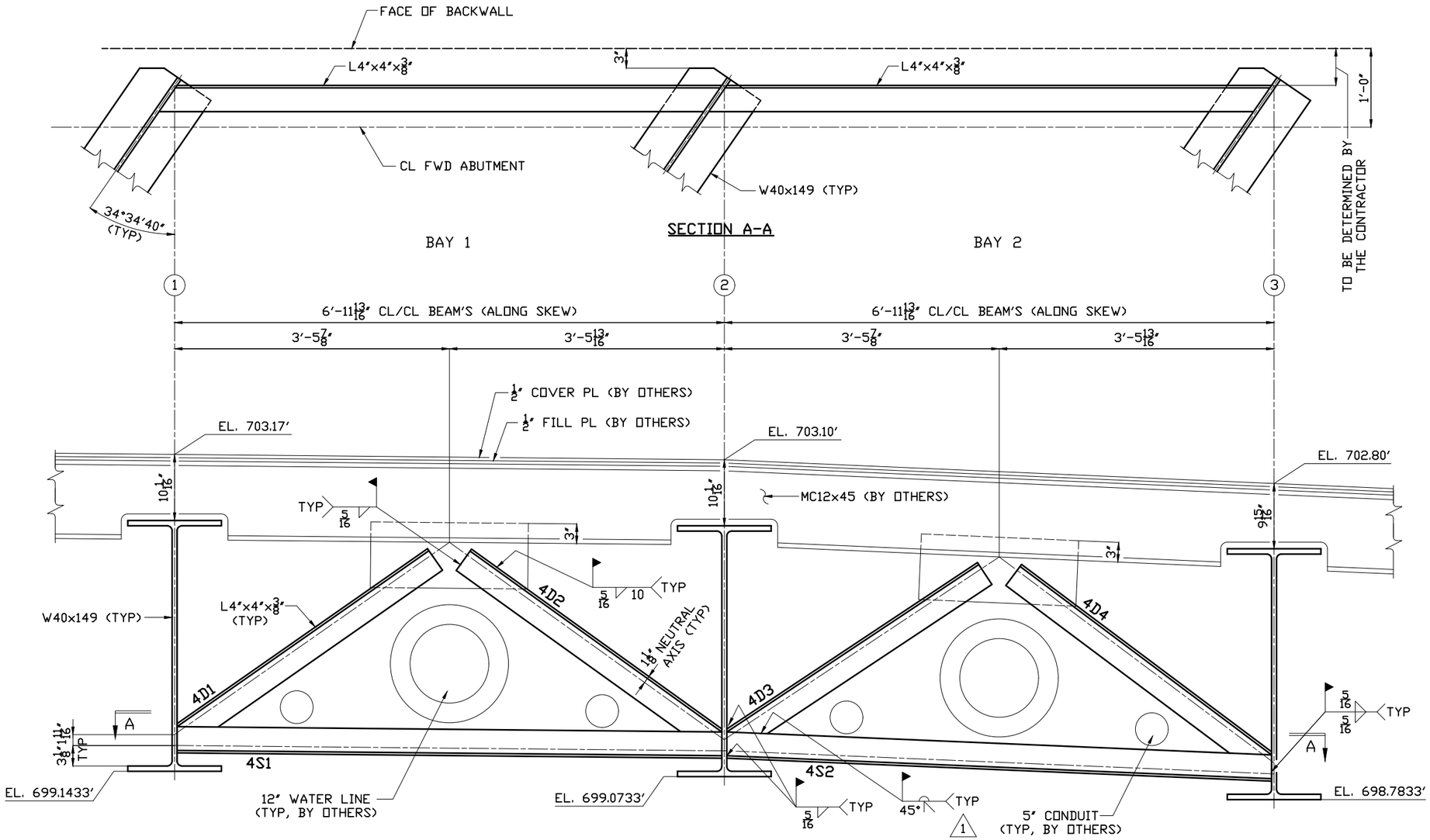
ERECTION DETAILS - REAR ABUTMENT CROSS FRAME DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED FIELD WELD SYMBOL 6/17/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ___ DATE ___

DWG. NO. E2

CONT. NO. 19-782



FWD ABUTMENT CROSSFRAME

LOOKING AHEAD STATIONS

WATERLINE OR ELECTRICAL CONDUITS NOT SHOWN FOR CLARITY AND ARE NOT BY SFI

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING
PRIMER
INTERMEDIATE
FINISH

TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

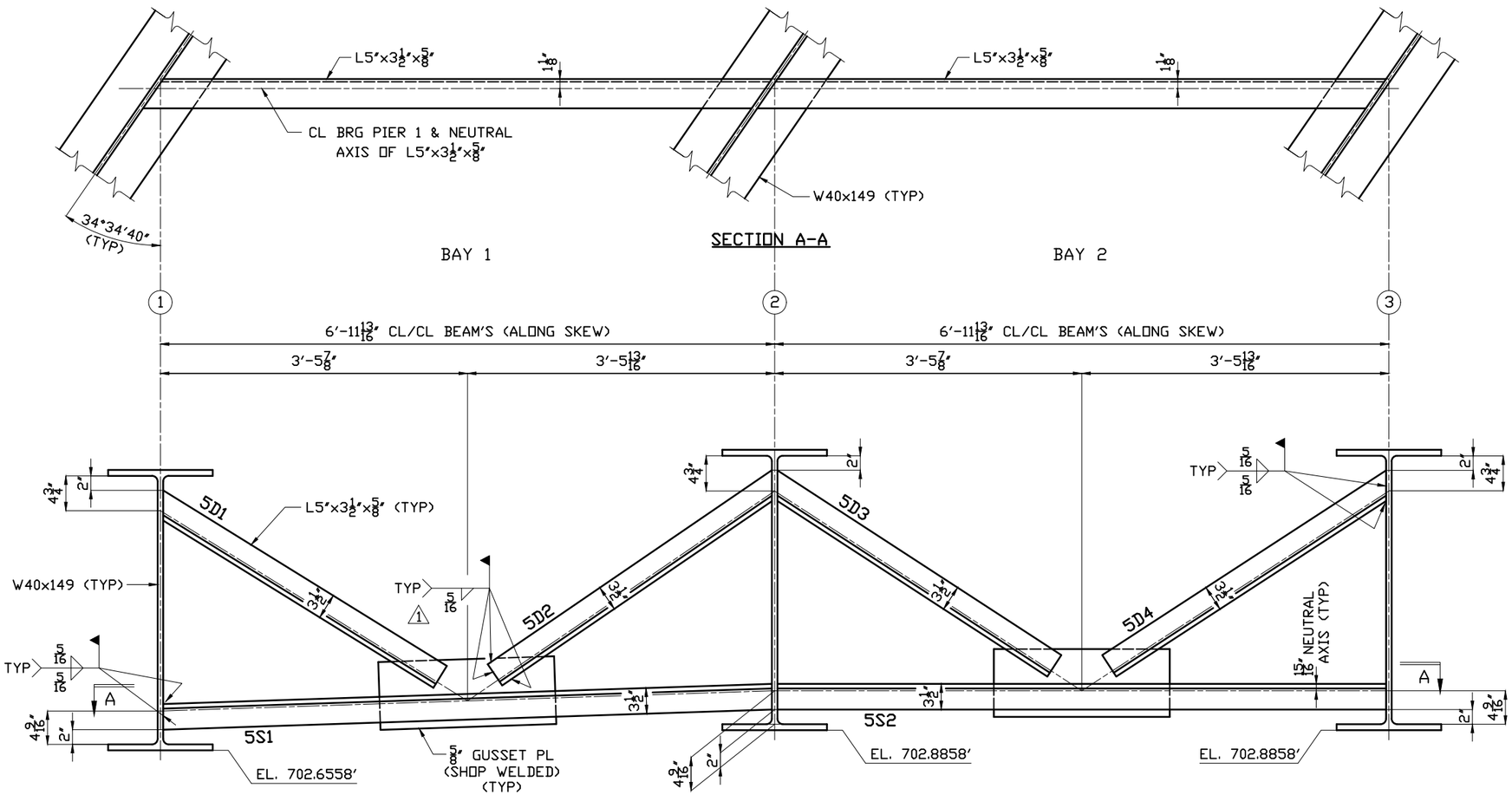
ERECTION DETAILS - FWD ABUTMENT CROSS FRAME DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED FIELD WELD SYMBOL 6/17/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ___ DATE ___

DWG. NO. E3

CONT. NO. 19-782



SECTION A-A

PIER 1 CROSSFRAME
LOOKING AHEAD STATIONS

1 WATERLINE OR ELECTRICAL CONDUITS NOT SHOWN FOR CLARITY AND ARE NOT BY SFI

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING
PRIMER
INTERMEDIATE
FINISH

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER

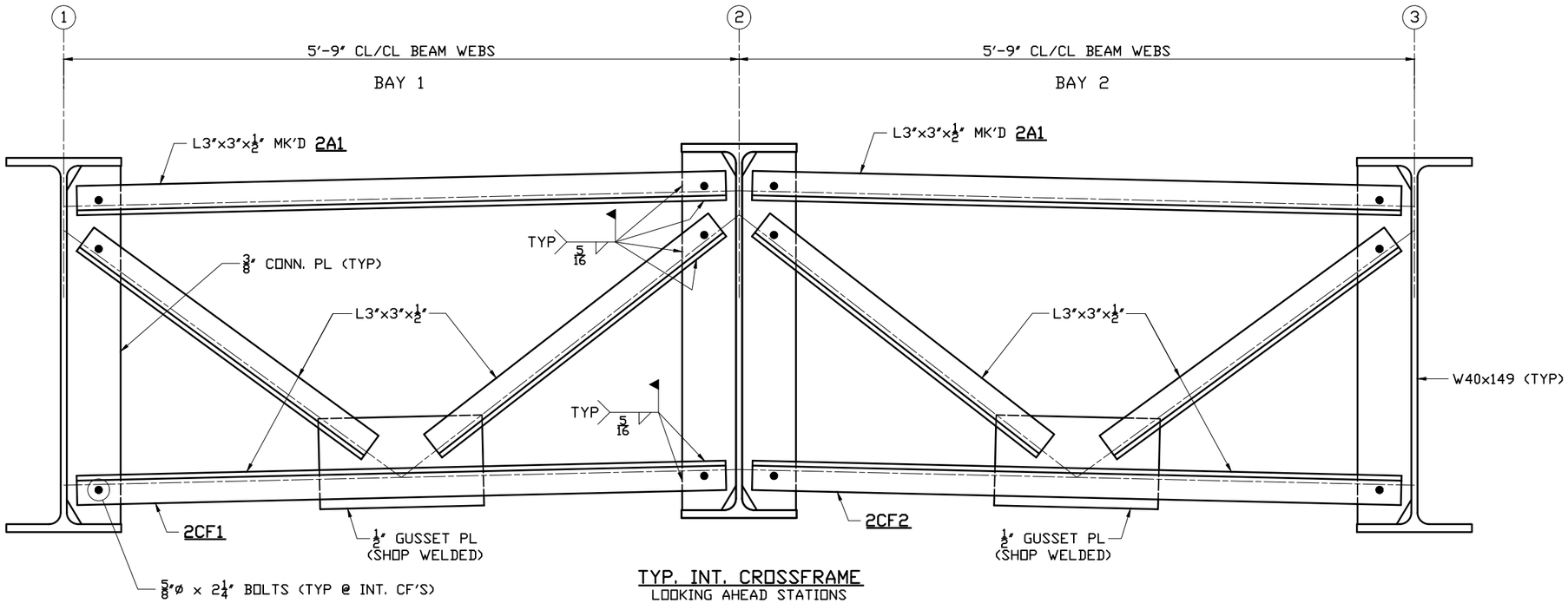
SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

ERECTION DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 REMOVED APPROVER NOTE 6/17/20
2
3
4

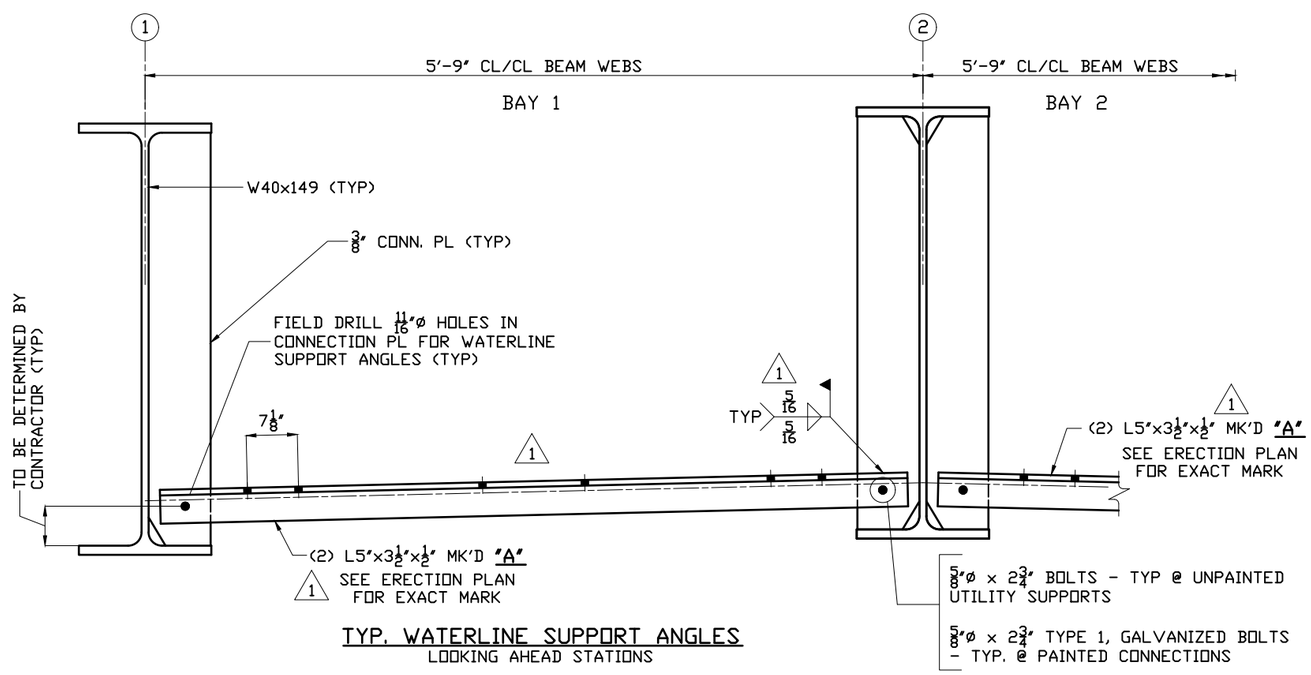
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ___ DATE ___

DWG. NO. E4
CONT. NO. 19-782



TYP. INT. CROSSFRAME
LOOKING AHEAD STATIONS

WATERLINE OR ELECTRICAL CONDUITS NOT SHOWN FOR CLARITY AND ARE NOT BY SFI



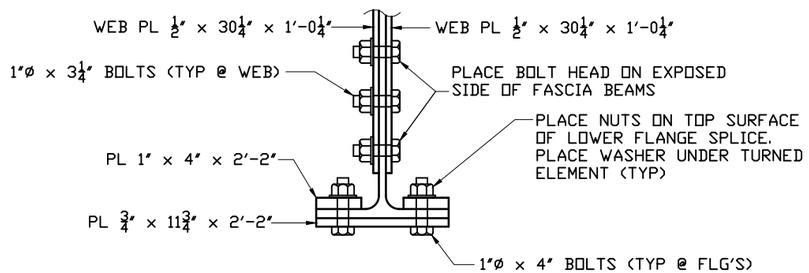
TYP. WATERLINE SUPPORT ANGLES
LOOKING AHEAD STATIONS

WATERLINE OR ELECTRICAL CONDUITS NOT SHOWN FOR CLARITY AND ARE NOT BY SFI

BOLT NOTE:

1 -ALL BOLTS FOR CROSSFRAMES AND UTILITY SUPPORTS ARE TYPE 1 OR TYPE 3 HIDH STRENGTHS BOLTS WITH ONE HVY. HEX NUT AND TWO HARDENED WASHERS.

-ALL FIELD SPLICE BOLTS ARE TYPE 3 WEATHERING HIGH STRENGTH BOLTS WITH ONE HVY. HEX NUT AND ONE HARDENED WASHER. PLACE WASHER UNDER TURNED ELEMENT (NUT).



SPLICE PLATE LAYOUT
BOT FLG SHOWN, TOP FLG SIMILAR

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING
PRIMER
INTERMEDIATE
FINISH
TO SHOP:

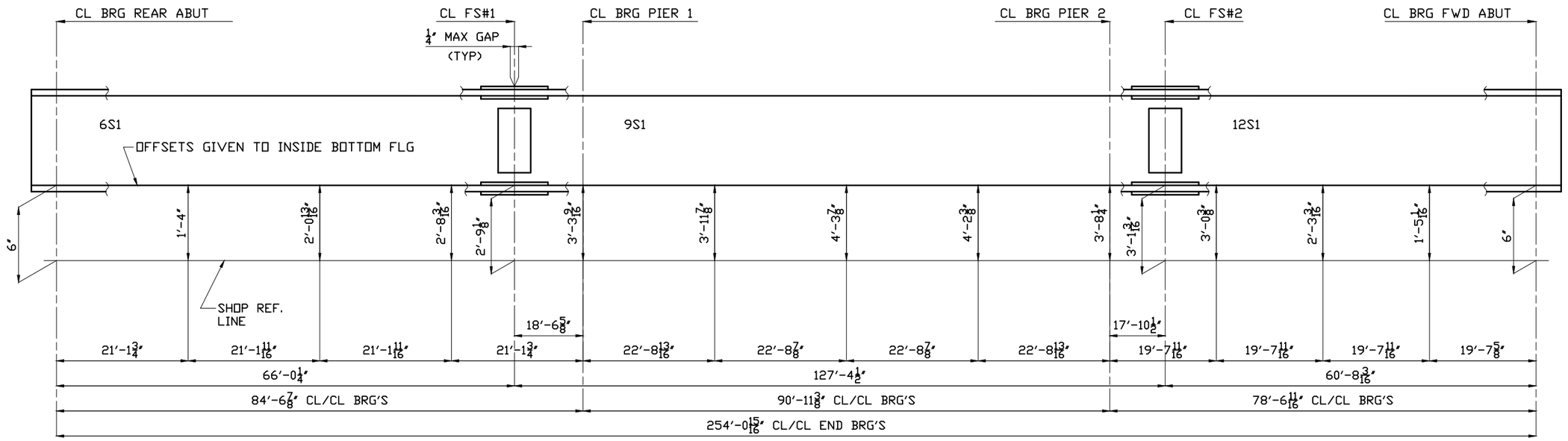
SFI **SHANE FELTER INDUSTRIES**
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

ERECTION DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 APPROVER COMMENTS 6/17/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ___ DATE ___

DWG. NO. E5
CONT. NO. 19-782



BLOCKING DIAGRAM ~ LINE 1

1 BLOCKING DIAGRAM DIMENSIONS THIS SHEET ARE DERIVED FROM THE BLOCKING DIAGRAM DIMENSIONS SHOWN IN THE CONTRACT DRAWINGS +6".

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING
PRIMER
INTERMEDIATE
FINISH

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

SFI

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

SHOP BLOCKING DIAGRAM - LINE 1

BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28

CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833

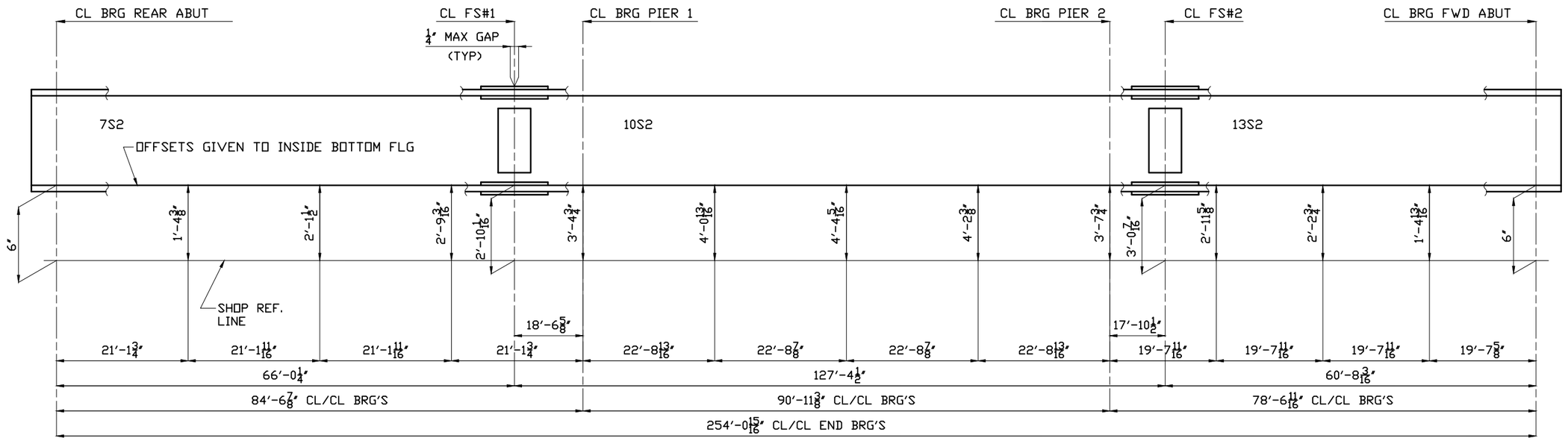
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED NOTE 6/17/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ____ DATE ____

DWG. NO. BD1

CONT. NO. 19-782



BLOCKING DIAGRAM ~ LINE 2

1 BLOCKING DIAGRAM DIMENSIONS THIS SHEET ARE DERIVED FROM THE BLOCKING DIAGRAM DIMENSIONS SHOWN IN THE CONTRACT DRAWINGS +6".

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING

PRIMER

INTERMEDIATE

FINISH

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

SFI

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

SHOP BLOCKING DIAGRAM - LINE 2

BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28

CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833

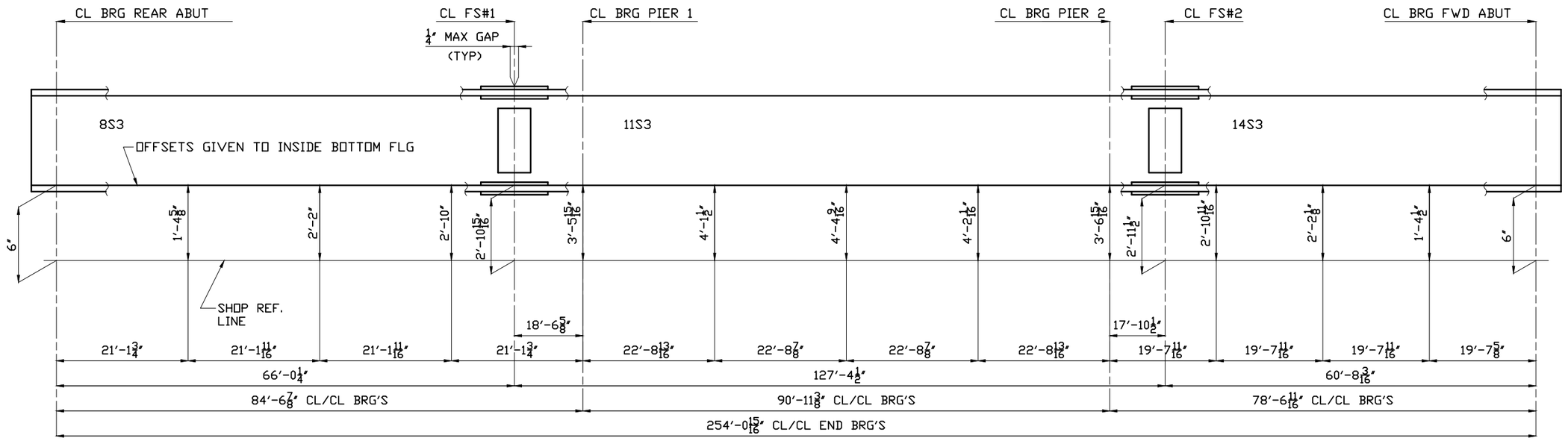
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED NOTE 6/17/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ____ DATE ____

DWG. NO. BD2

CONT. NO. 19-782



BLOCKING DIAGRAM ~ LINE 3

1 BLOCKING DIAGRAM DIMENSIONS THIS SHEET ARE DERIVED FROM THE BLOCKING DIAGRAM DIMENSIONS SHOWN IN THE CONTRACT DRAWINGS +6".

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING
PRIMER
INTERMEDIATE
FINISH

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER

SFI

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

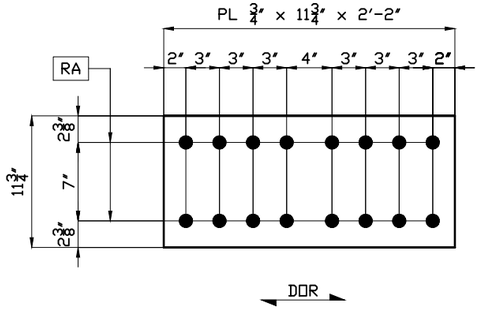
SHOP BLOCKING DIAGRAM - LINE 3
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED NOTE 6/17/20
2
3
4

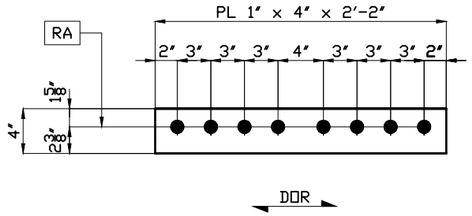
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ____ DATE ____

DWG. NO. BD3

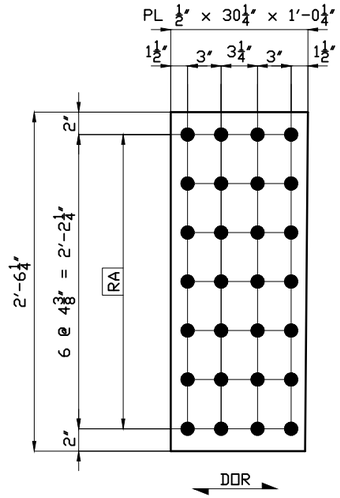
CONT. NO. 19-782



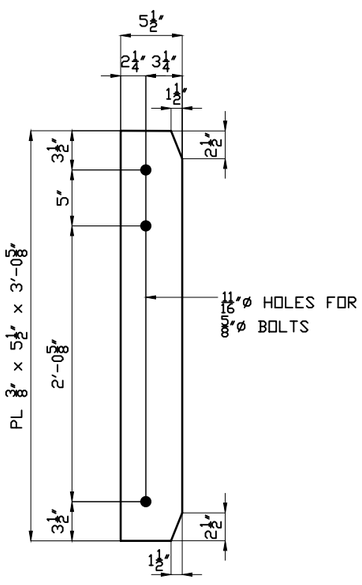
12 ~TOP OR BOT FLG SPLICE PLS~ a1 ~CVN



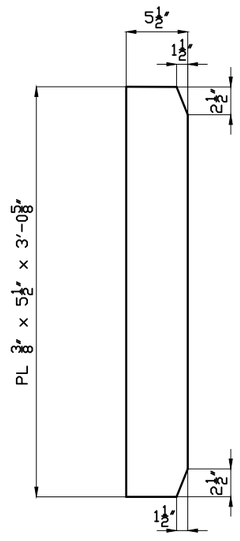
24 ~TOP OR BOT FLG SPLICE PLS~ b1 ~CVN



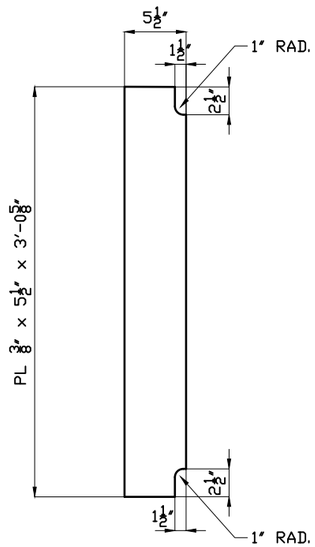
12 ~WEB SPLICE PLS~ c1 ~CVN



64 ~CONN. PL'S~ d1



1 90 ~UTILITY CONN. PL'S~ e1



1 8 ~UTILITY CONN. PL'S~ f1
(PAINTED)

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING PER GN1AB
PRIMER AS NOTED PER GN1AB
INTERMEDIATE N/A
FINISH N/A
TO SHOP:

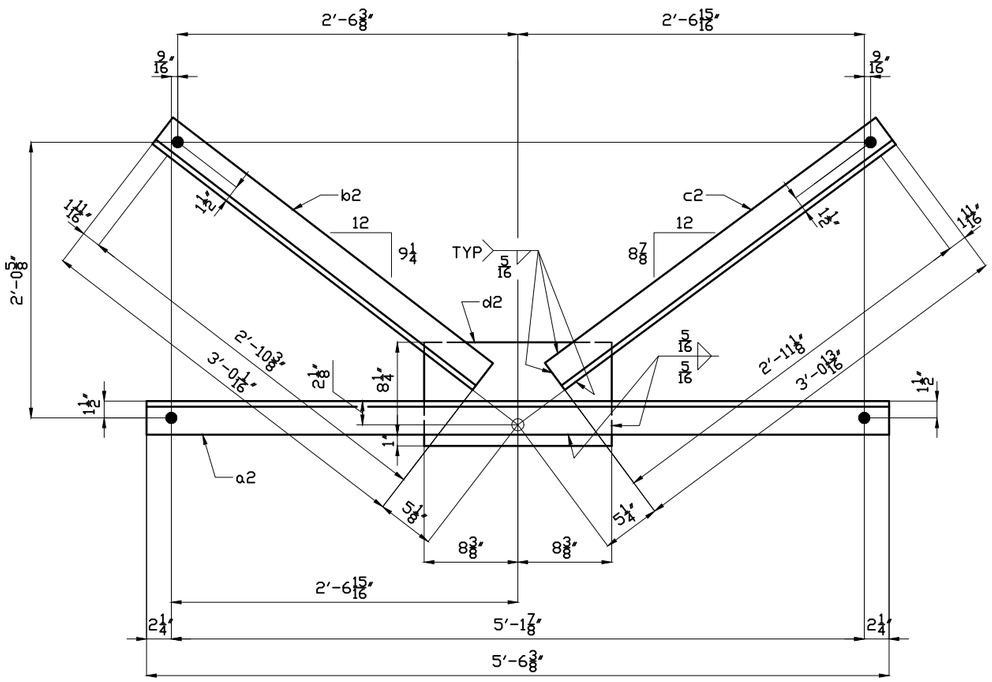
SFI
SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

JOB STANDARD DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS			
1	REVISED QUANTITIES 6/17/20	DR. CCD-MC	DATE 2/20
2		CH. CCD-JB	DATE 2/20
3		APP.	DATE
4			

DWG. NO. 1

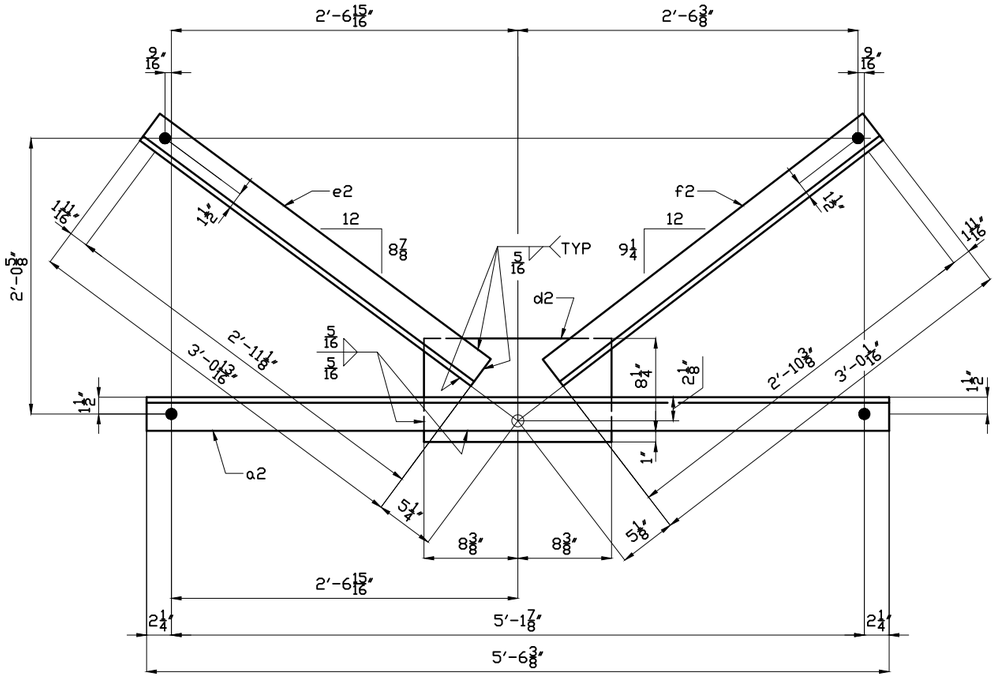
CONT. NO. 19-782



16 ~CROSS FRAMES~ 2CF1

a2, b2, c2 - L3"x3"x$\frac{1}{2}$"

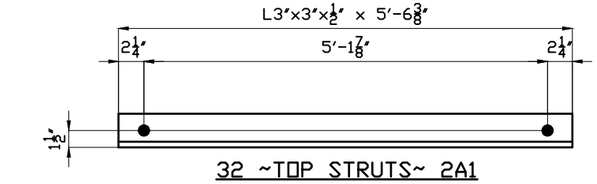
d2 - PL $\frac{1}{2}$" x 9$\frac{1}{4}$" x 1'-4$\frac{3}{4}$"



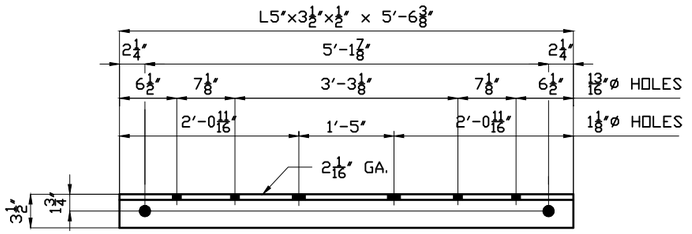
16 ~CROSS FRAMES~ 2CF2

a2, e2, f2 - L3"x3"x$\frac{1}{2}$"

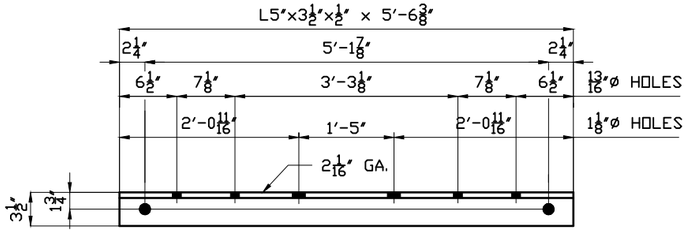
d2 - PL $\frac{1}{2}$" x 9$\frac{1}{4}$" x 1'-4$\frac{3}{4}$"



32 ~TOP STRUTS~ 2A1

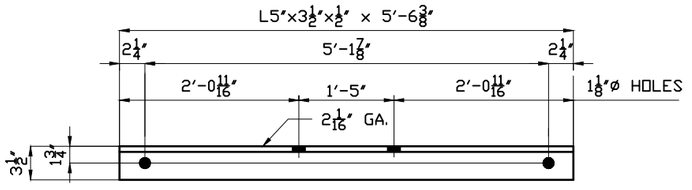


1 45 ~UTILITY SUPPORT~ 2A2

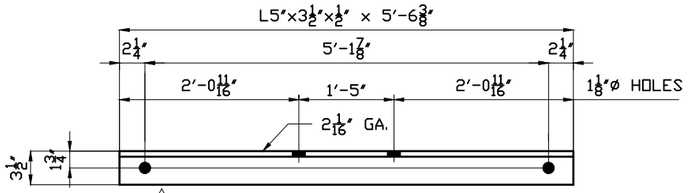


1 4 ~UTILITY SUPPORTS~ 2A3

(PAINTED)



1 45 ~UTILITY SUPPORTS~ 2A4



1 4 ~UTILITY SUPPORTS~ 2A5

(PAINTED)

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

BILL OF MATERIAL

	PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
1			2A1	32	L3"x3"x$\frac{1}{2}$" x 5'-6$\frac{3}{8}$"		
1			2A2	45	L5"x3$\frac{1}{2}$"x$\frac{1}{2}$" x 5'-6$\frac{3}{8}$"		
1			2A3	4	L5"x3$\frac{1}{2}$"x$\frac{1}{2}$" x 5'-6$\frac{3}{8}$"		PAINT
1			2A4	45	L5"x3$\frac{1}{2}$"x$\frac{1}{2}$" x 5'-6$\frac{3}{8}$"		PAINT
1			2A5	4	L5"x3$\frac{1}{2}$"x$\frac{1}{2}$" x 5'-6$\frac{3}{8}$"		PAINT
			2CF1	16	CROSS FRAMES		
			a2	16	L3"x3"x$\frac{1}{2}$" x 5'-6$\frac{3}{8}$"		
			b2	16	L3"x3"x$\frac{1}{2}$" x 3'-0$\frac{1}{16}$"		
			c2	16	L3"x3"x$\frac{1}{2}$" x 3'-0$\frac{13}{16}$"		
			d2	16	PL $\frac{1}{2}$" x 9$\frac{1}{4}$" x 1'-4$\frac{3}{4}$"		
			2CF2	16	CROSS FRAMES		
			a2	16	L3"x3"x$\frac{1}{2}$" x 5'-6$\frac{3}{8}$"		
			e2	16	L3"x3"x$\frac{1}{2}$" x 3'-0$\frac{13}{16}$"		
			f2	16	L3"x3"x$\frac{1}{2}$" x 3'-0$\frac{1}{16}$"		
			d2	16	PL $\frac{1}{2}$" x 9$\frac{1}{4}$" x 1'-4$\frac{3}{4}$"		

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: $\frac{13}{16}$" DIA. HOLES UNLESS NOTED $\frac{5}{8}$" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING PER GN1AB

PRIMER AS NOTED PER GN1AB

INTERMEDIATE N/A

FINISH N/A

TO SHOP:

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

INTERMEDIATE CROSS FRAME DETAILS

BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28

CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833

FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 REM. PAINT NOTES/FIX. HOLES 6/17/20
2
3
4

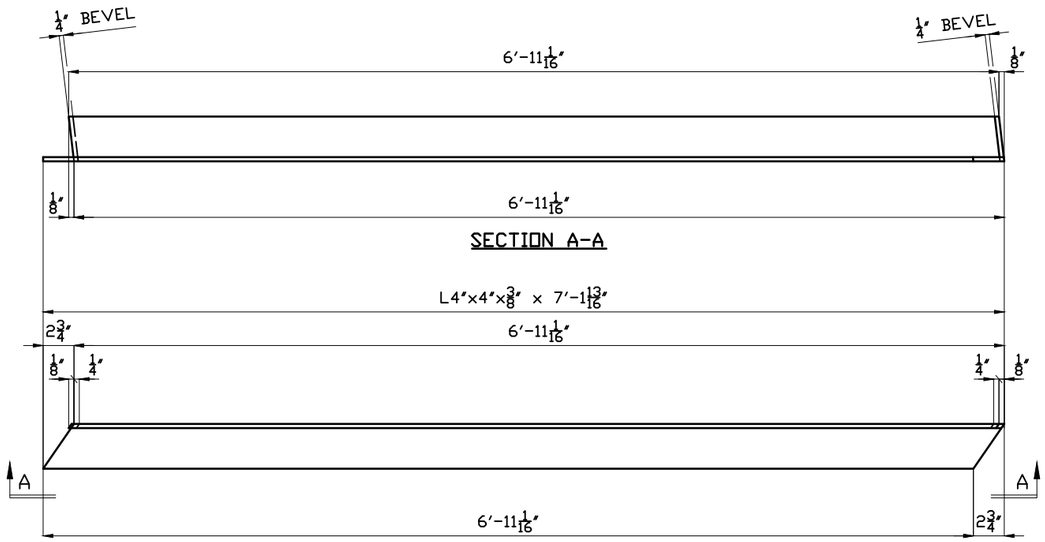
DR. CCD-MC DATE 2/20

CH. CCD-JB DATE 2/20

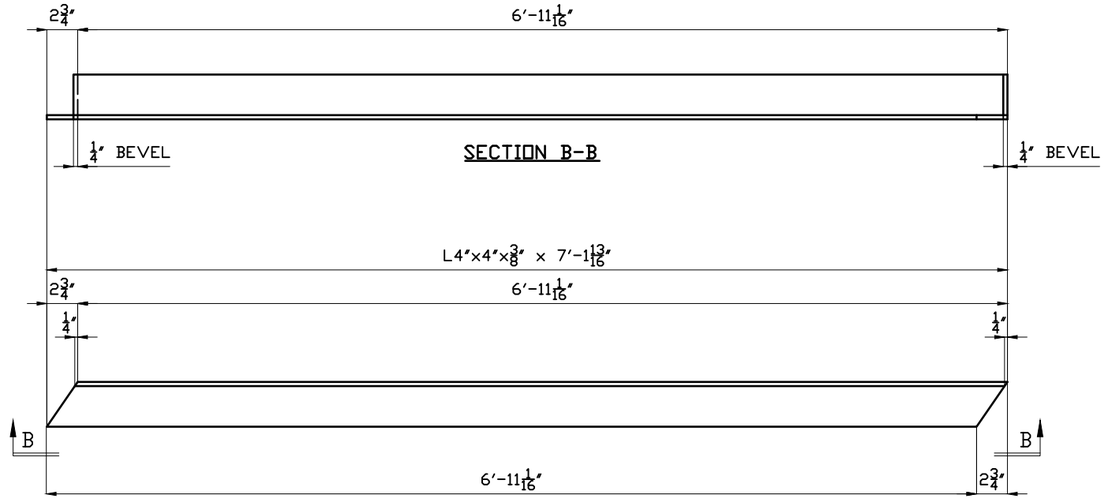
APP. DATE

DWG. NO. 2

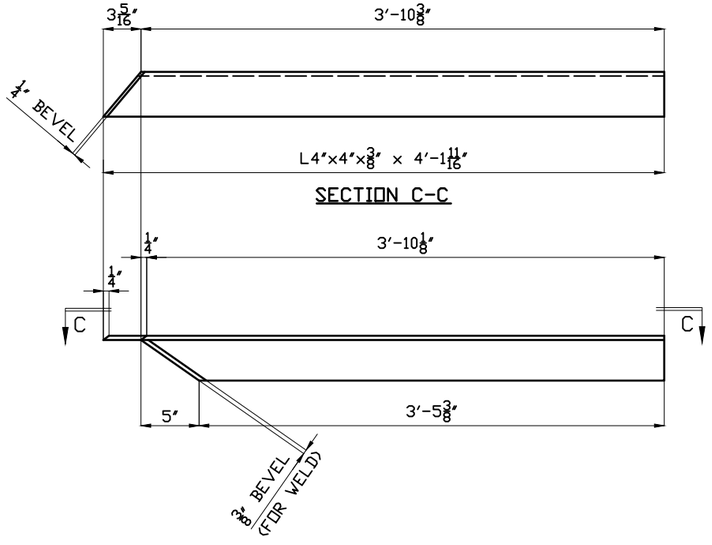
CONT. NO. 19-782



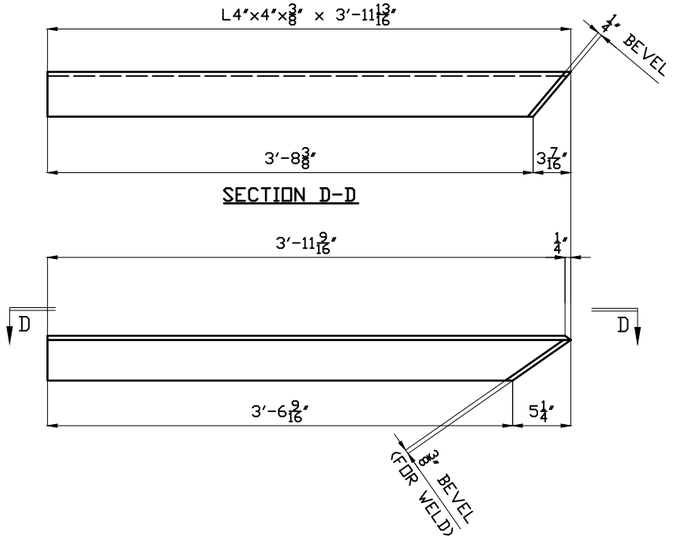
ONE ~REAR ABUT STRUT~ 3S1
BAY 1



ONE ~REAR ABUT STRUT~ 3S2
BAY 2



ONE ~REAR ABUT DIAG.~ 3D1
BAY 1



ONE ~REAR ABUT DIAG.~ 3D2
BAY 1

WORK THIS DWG. WITH DWG. 3B

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS:

CLEANING	PER GN1AB
PRIMER	AS NOTED PER GN1AB
INTERMEDIATE	N/A
FINISH	N/A

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER

SFI

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

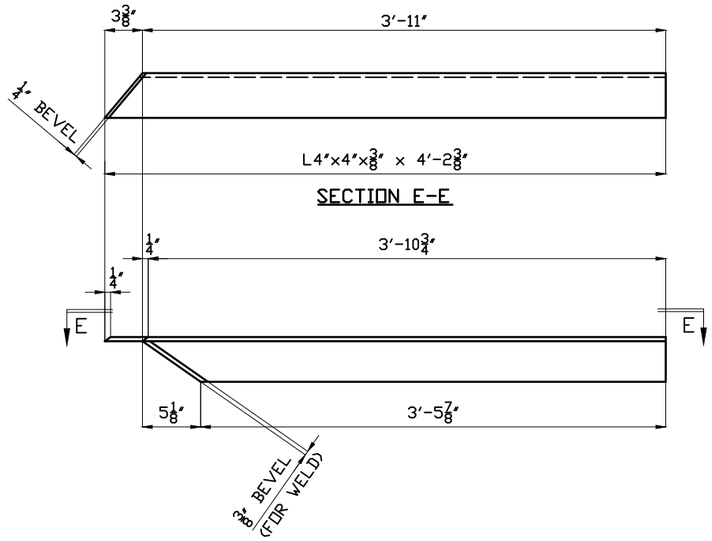
REAR ABUTMENT CROSS FRAME DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1
2
3
4

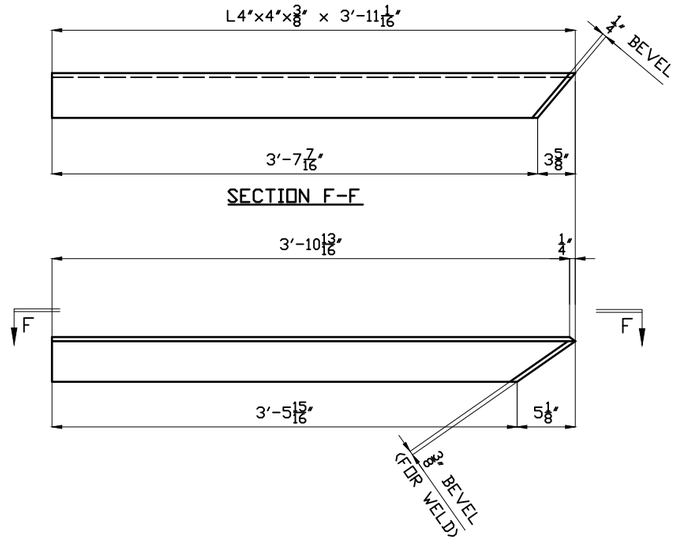
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ___ DATE ___

DWG. NO. 3AB

CONT. NO. 19-782



ONE ~REAR ABUT DIAG.~ 3D3
BAY 2



ONE ~REAR ABUT DIAG.~ 3D4
BAY 2

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		3S1	1	L4"x4"x3/8" x 7'-1 13/16"		PAINT
		3S2	1	L4"x4"x3/8" x 7'-1 13/16"		PAINT
		3D1	1	L4"x4"x3/8" x 4'-1 11/16"		PAINT
		3D2	1	L4"x4"x3/8" x 3'-11 13/16"		
		3D3	1	L4"x4"x3/8" x 4'-2 3/8"		
		3D4	1	L4"x4"x3/8" x 3'-11 1/16"		
				FIELD BOLTS W/ HVY HEX NUT AND HARD WASHER (A325-3, A563 GR DH3, F436-3) EXACT COUNT		
			NET			
			192	H.S.B. 1"ø x 4"		FLG SPL
			168	H.S.B. 1"ø x 3 1/4"		WEB SPL
			360	H.W. 1"ø		
				FIELD BOLTS W/ HVY HEX NUT AND TWO HARD WASHER (A325-3, A563 GR DH3, F436-3) EXACT COUNT		
			NET			
			192	H.S.B. 5/8"ø x 2 1/4"		INT. CF
		1	90	H.S.B. 5/8"ø x 2 3/4"		UT ANGLE
			564	H.W. 5/8"ø		
				FIELD BOLTS W/ HVY HEX NUT AND TWO HARD WASHER (A325-1, A563 GR DH, F436-1) EXACT COUNT		
			NET			
		1	8	H.S.B. 5/8"ø x 2 3/4" HOT DIP GALV		UT ANGLE
			16	H.W. 5/8"ø HOT DIP GALV		
				SUMMARY OF PARTIALLY THREADED SAFETY STUDS		
			NET			
		1	60	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428		

WORK THIS DWG. WITH DWG. 3AB

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING PER GN1AB
PRIMER AS NOTED PER GN1AB
INTERMEDIATE N/A
FINISH N/A

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI E-48751
REGISTERED PROFESSIONAL ENGINEER

SFI
SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

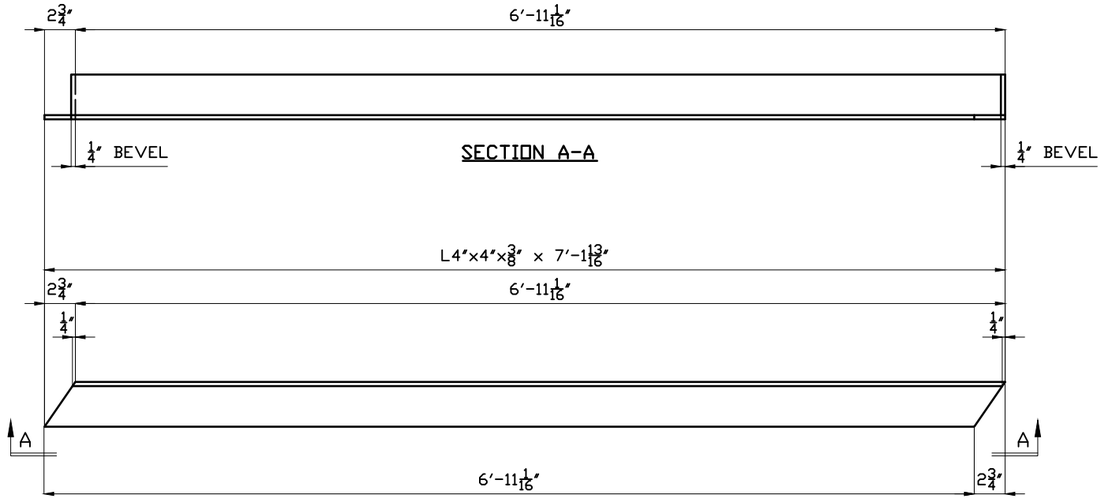
REAR ABUTMENT CROSS FRAME DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 BOLT QTY. & STUD SUMMARY 6/17/20
2
3
4

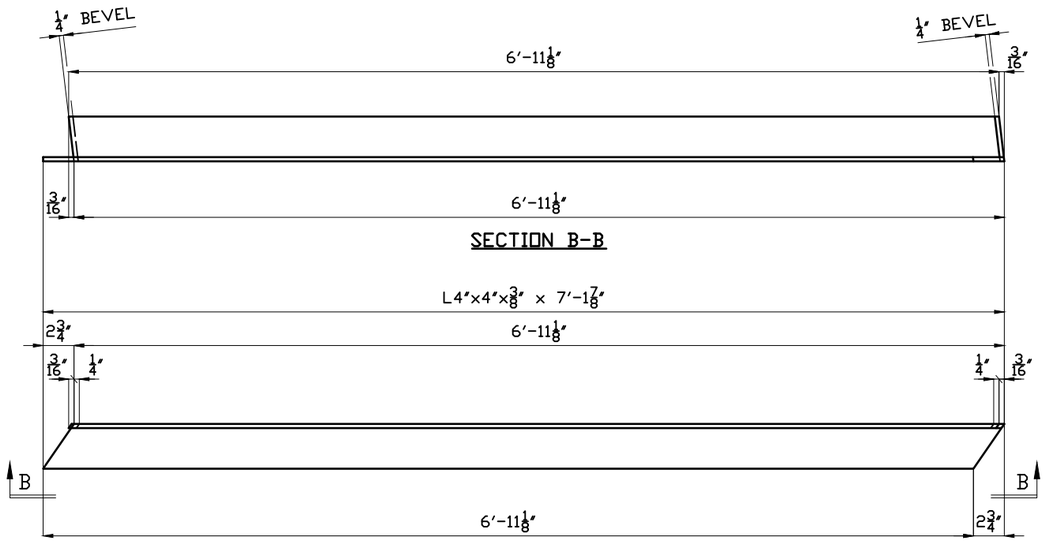
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ____ DATE ____

DWG. NO. 3B

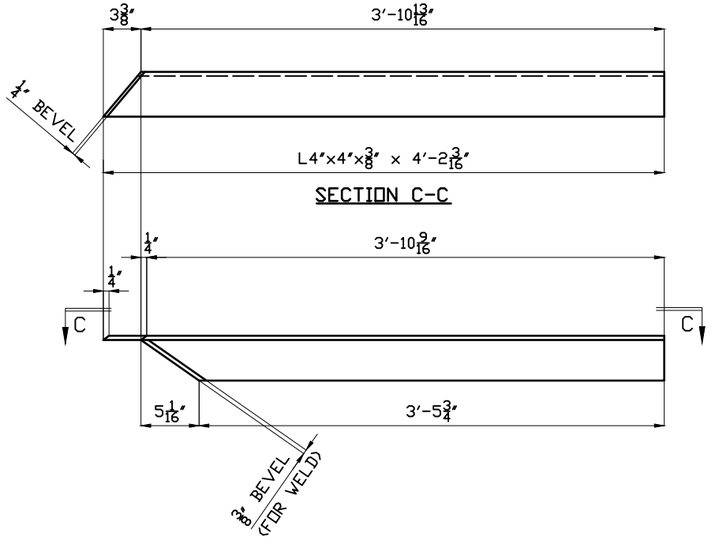
CONT. NO. 19-782



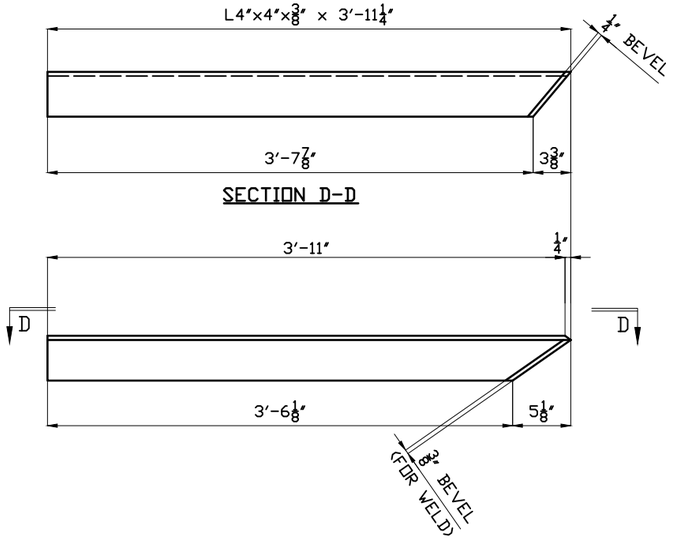
ONE ~FWD ABUT STRUT~ 4S1
BAY 1



ONE ~FWD ABUT STRUT~ 4S2
BAY 2



ONE ~FWD ABUT DIAG.~ 4D1
BAY 1



ONE ~FWD ABUT DIAG.~ 4D2
BAY 1

WORK THIS DWG. WITH DWG. 4B

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS:

CLEANING	PER GN1AB
PRIMER	AS NOTED PER GN1AB
INTERMEDIATE	N/A
FINISH	N/A

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

SFI

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

REAR ABUTMENT CROSS FRAME DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

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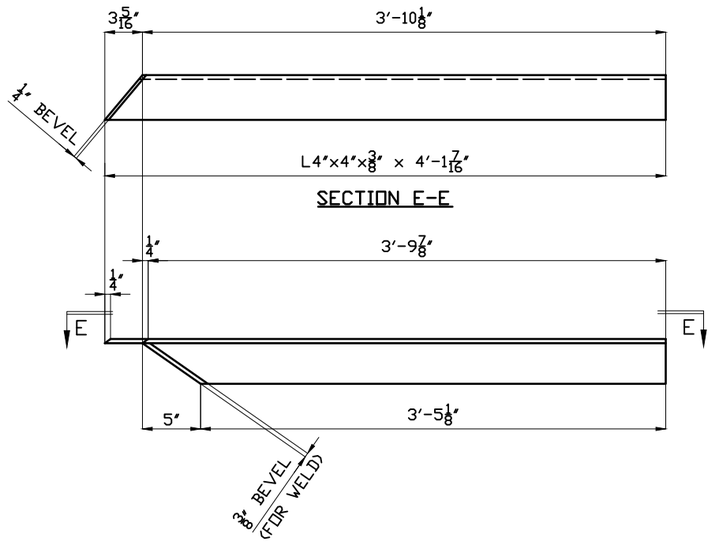
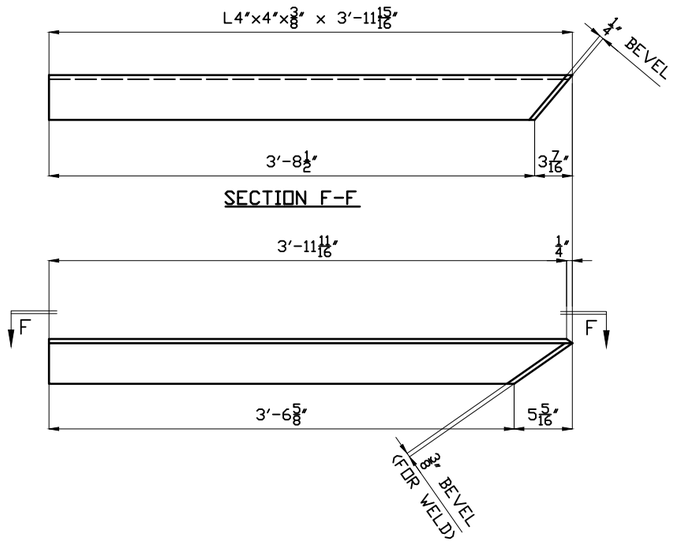
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ___ DATE ___

DWG. NO. 4AB

CONT. NO. 19-782



ONE ~FWD ABUT DIAG.~ 4D3
BAY 2



ONE ~FWD ABUT DIAG.~ 4D4
BAY 2

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		4S1	1	L4"x4"x3/8" x 7'-1 13/16"		PAINT
		4S2	1	L4"x4"x3/8" x 7'-1 7/8"		PAINT
		4D1	1	L4"x4"x3/8" x 4'-2 3/16"		PAINT
		4D2	1	L4"x4"x3/8" x 3'-11 1/4"		
		4D3	1	L4"x4"x3/8" x 4'-1 7/16"		
		4D4	1	L4"x4"x3/8" x 3'-11 15/16"		

WORK THIS DWG. WITH DWG. 4AB

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING PER GN1AB
PRIMER AS NOTED PER GN1AB
INTERMEDIATE N/A
FINISH N/A

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

SFI

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

FWD ABUTMENT CROSS FRAME DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
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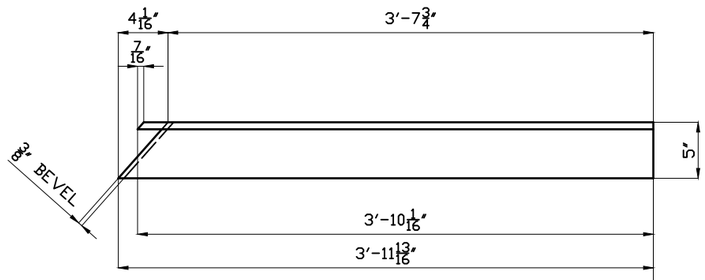
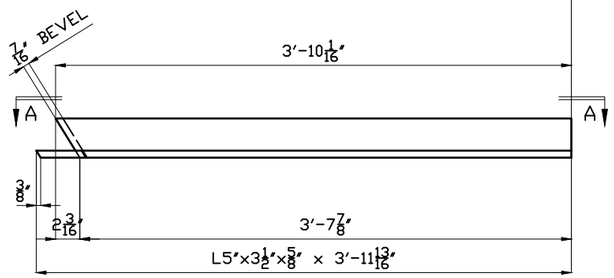
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ____ DATE ____

DWG. NO. 4B

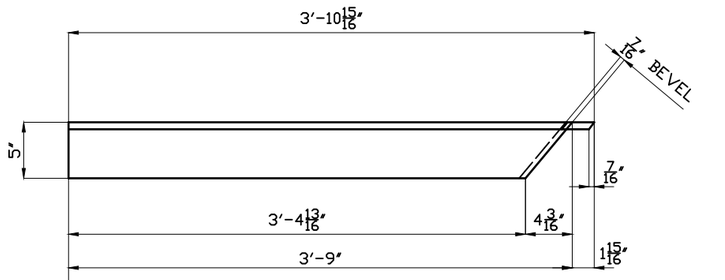
CONT. NO. 19-782



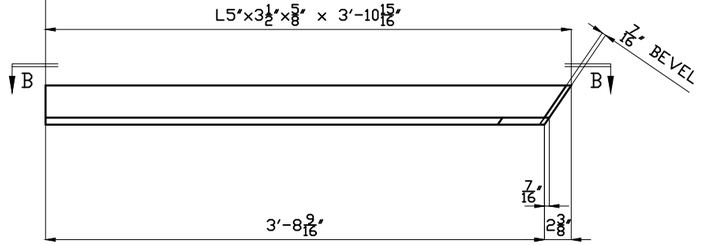
SECTION A-A



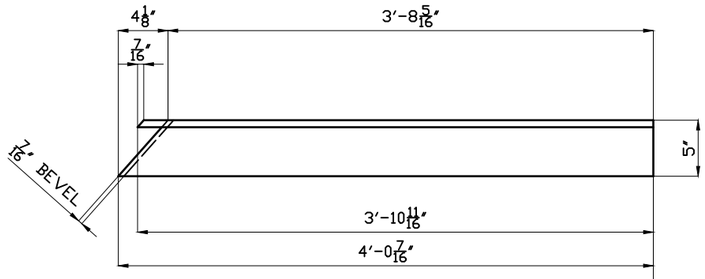
ONE ~PIER DIAG.~ 5D1
PIER 1, BAY 1



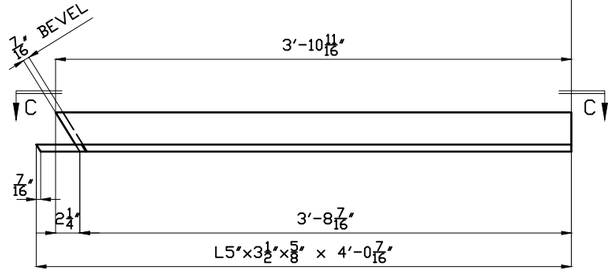
SECTION B-B



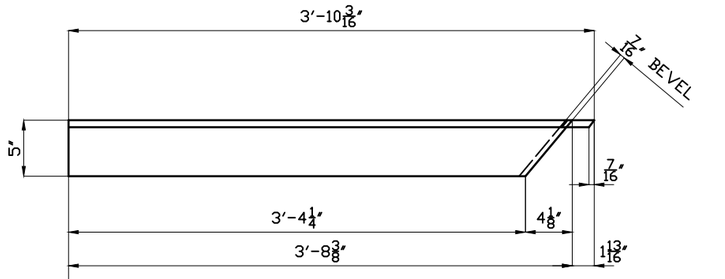
ONE ~PIER DIAG.~ 5D2
PIER 1, BAY 1



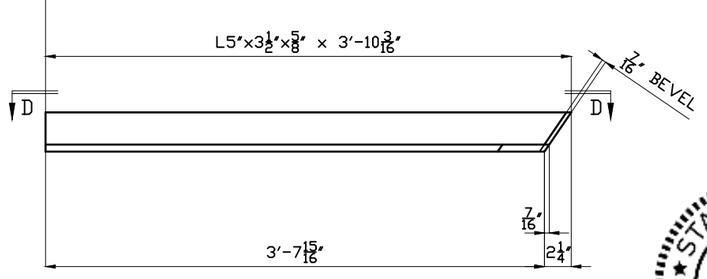
SECTION C-C



ONE ~PIER DIAG.~ 5D3
PIER 1, BAY 2



SECTION D-D



ONE ~PIER DIAG.~ 5D4
PIER 1, BAY 2

WORK THIS DWG. WITH DWG. 5B

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING PER GN1AB
PRIMER N/A
INTERMEDIATE N/A
FINISH N/A
TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

PIER 1 CROSS FRAME DETAILS
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

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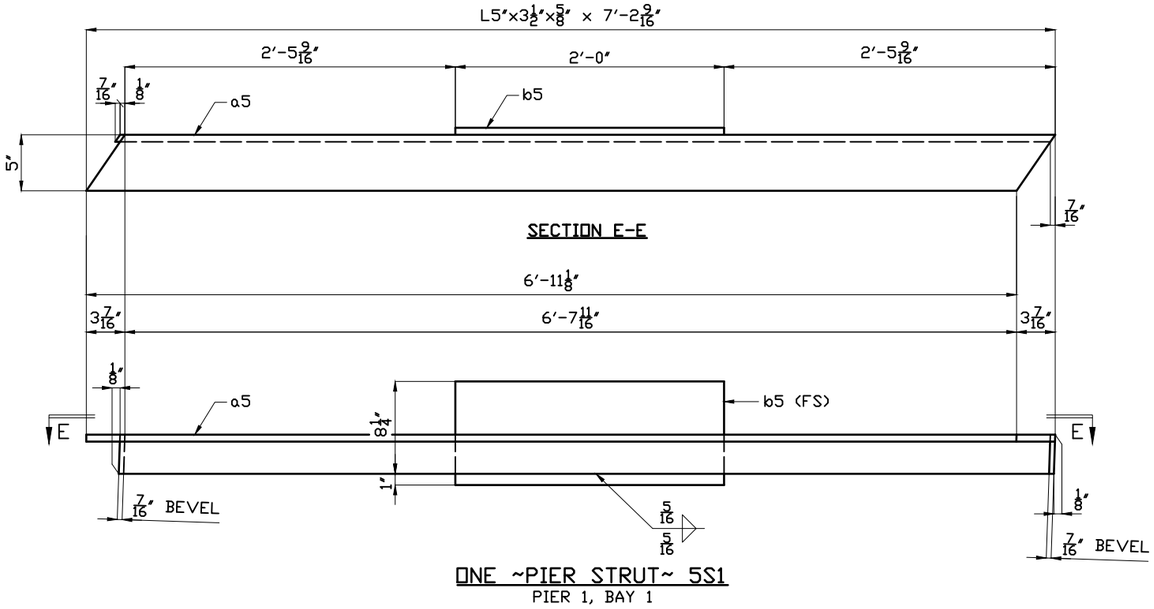
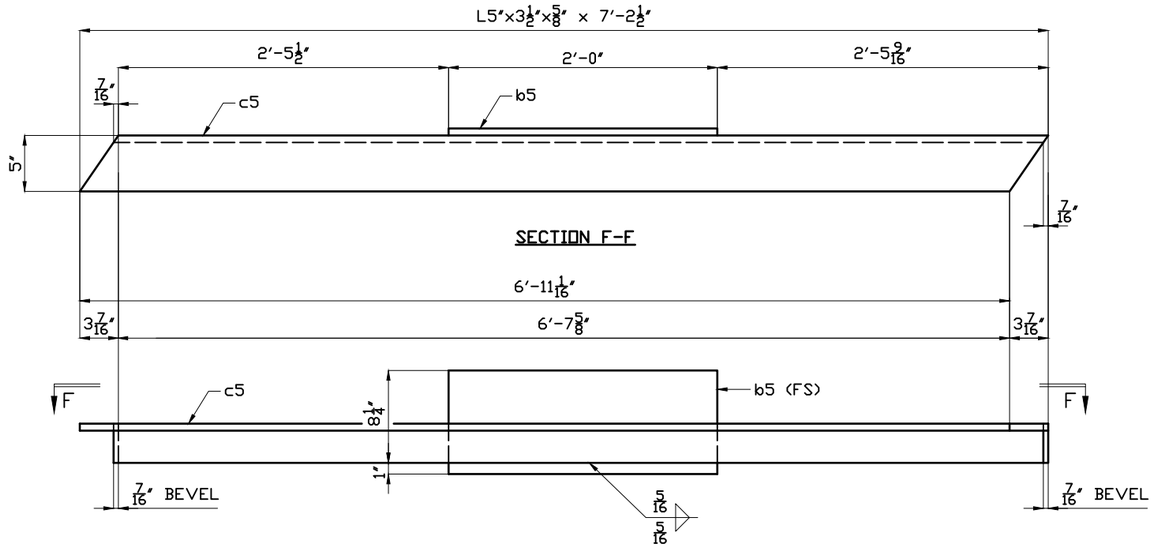
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ____ DATE ____

DWG. NO. 5AB
CONT. NO. 19-782



ONE ~PIER STRUT~ 5S1

PIER 1, BAY 1



2 ~PIER STRUT~ 5S2

PIER 1 BAY 2

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		5D1	1	L5″x3½″x⅝″ × 3′-11 13/16″		
		5D2	1	L5″x3½″x⅝″ × 3′-10 15/16″		
		5D3	1	L5″x3½″x⅝″ × 4′-0 7/16″		
		5D4	1	L5″x3½″x⅝″ × 3′-10 3/16″		
		5S1	1	BOTTOM STRUT		
		a5	1	L5″x3½″x⅝″ × 7′-2 9/16″		
		b5	1	PL ⅝″ × 9¼″ × 2′-0″		
		5S2	1	BOTTOM STRUT		
		c5	1	L5″x3½″x⅝″ × 7′-2½″		
		b5	1	PL ⅝″ × 9¼″ × 2′-0″		

WORK THIS DWG. WITH DWG. 5AB

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE ASTM A709 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT

NOTES: ___ DIA. HOLES UNLESS NOTED ___ DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING PER GN1AB
PRIMER N/A
INTERMEDIATE N/A
FINISH N/A
TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

SFI

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

PIER 1 CROSS FRAME DETAILS

BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28

CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833

FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
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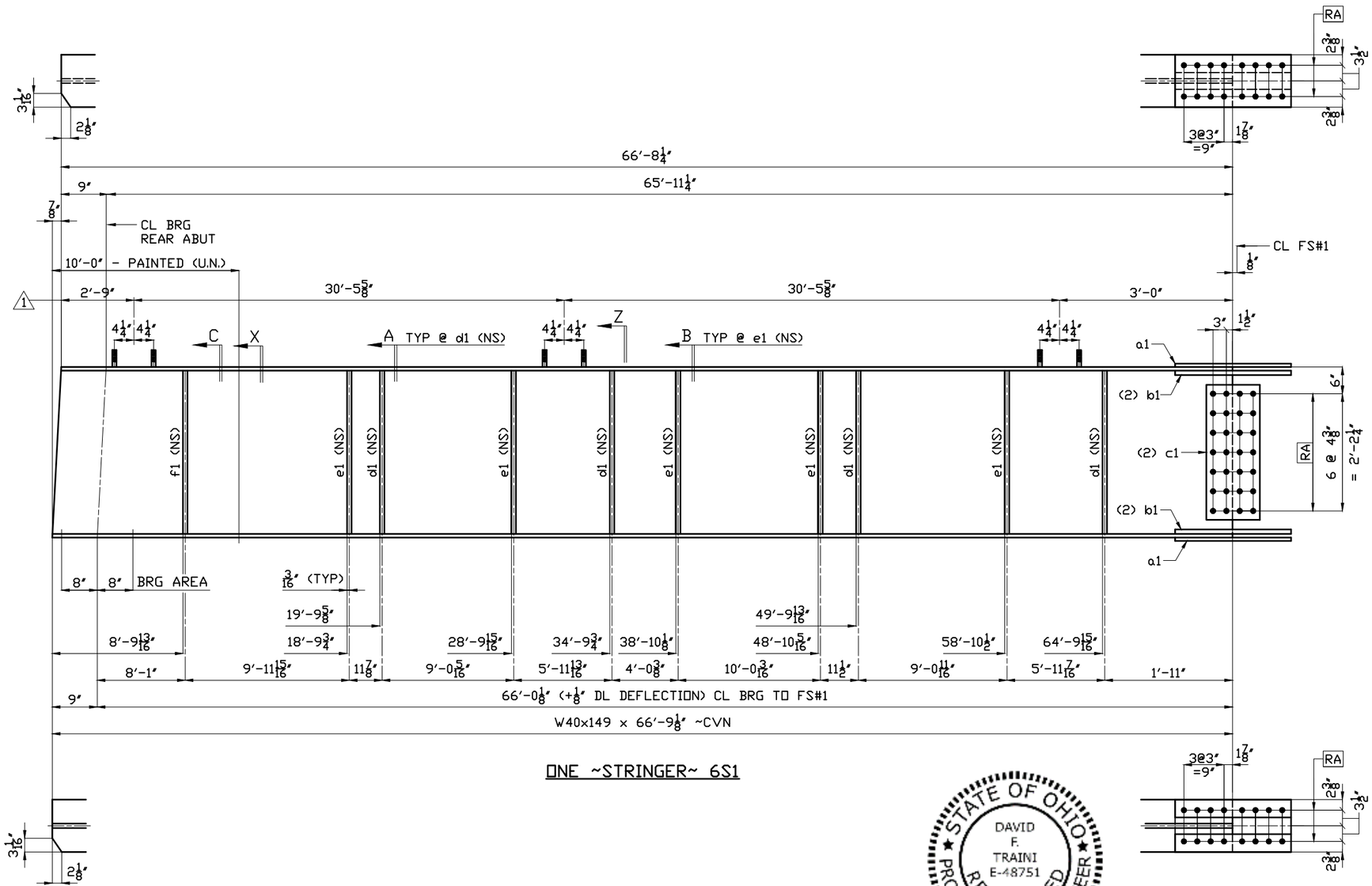
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. ___ DATE ___

DWG. NO. 5B

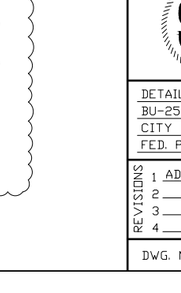
CONT. NO. 19-782

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		6S1	1	STRINGER		PAINT
				W40x149 x 66'-9 1/8" CVN		
		a1	2	PL 3/4" x 11 3/4" x 2'-2 CVN		
		b1	4	PL 1" x 4" x 2'-2" CVN		
		c1	2	PL 1/2" x 30 1/4" x 1'-0 1/4" CVN		
		d1	4	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		e1	5	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		f1	1	PL 3/8" x 5 1/2" x 3'-0 5/8"		
			6	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428	(1)	

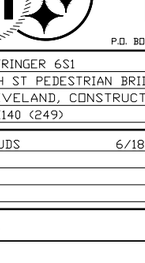


ONE ~STRINGER~ 6S1

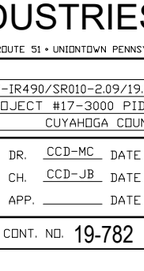


SECTION A

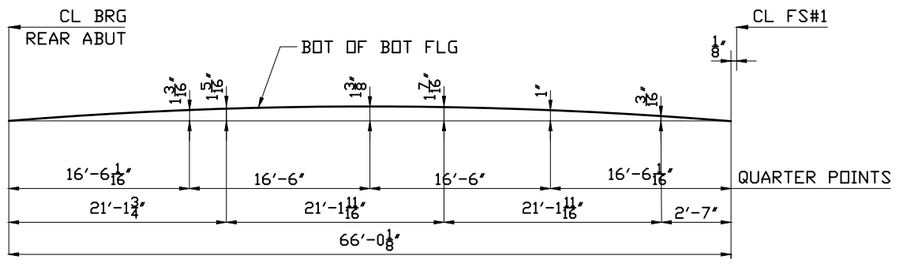
11/16"ø HOLES FOR 5/8"ø BOLTS



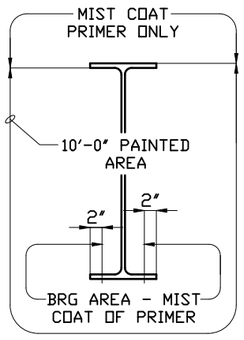
SECTION B



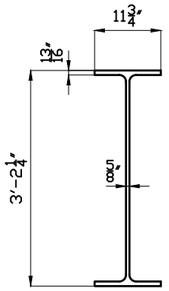
SECTION C



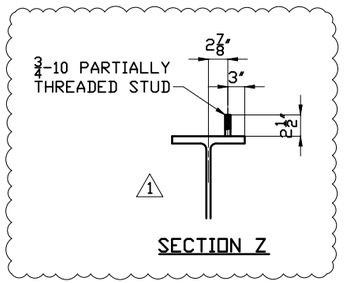
CAMBER DIAGRAM



SECTION X



W40x149



SECTION Z

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER

FOR SHOP NOTES SEE DWG. GN1AB/B.

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER SEE GN1AB
INTERMEDIATE NONE
FINISH NONE
TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

DETAIL OF STRINGER 6S1
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
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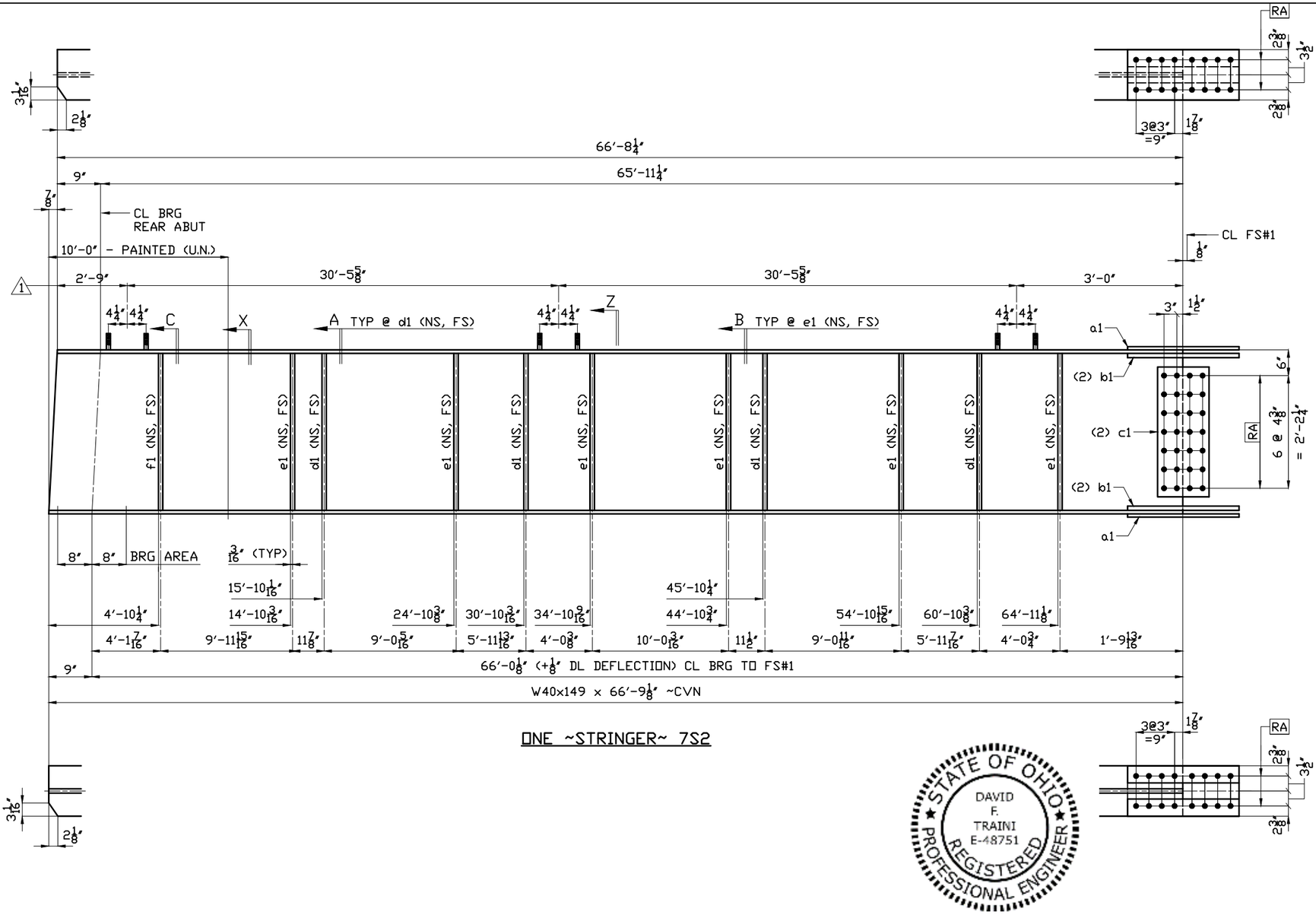
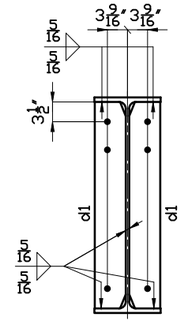
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 6

CONT. NO. 19-782

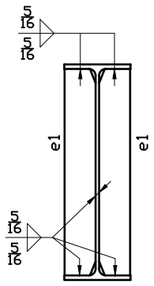


ONE ~STRINGER~ 7S2

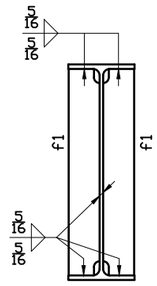


SECTION A

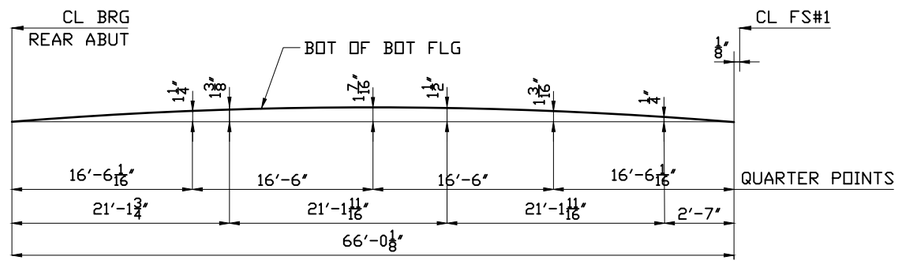
$\frac{11}{16}$"ø HOLES FOR
$\frac{5}{8}$"ø BOLTS



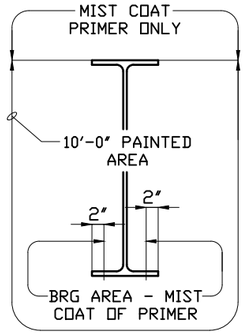
SECTION B



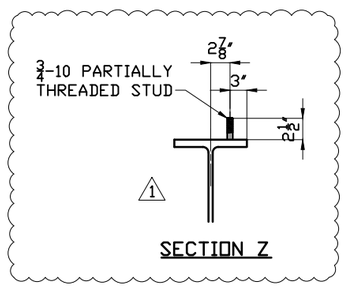
SECTION C



CAMBER DIAGRAM



SECTION X



SECTION Z

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		7S2	1	STRINGER		PAINT
				W40x149 x 66'-9 1/8" CVN		
		a1	2	PL 3/4" x 11 3/4" x 2'-2 CVN		
		b1	4	PL 1" x 4" x 2'-2" CVN		
		c1	2	PL 1/2" x 30 1/4" x 1'-0 1/4" CVN		
		d1	8	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		e1	12	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		f1	2	PL 3/8" x 5 1/2" x 3'-0 5/8"		
			6	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428	1	

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: $1\frac{1}{16}$" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER SEE GN1AB
INTERMEDIATE NONE
FINISH NONE

TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

DETAIL OF STRINGER 7S2
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
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DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 7
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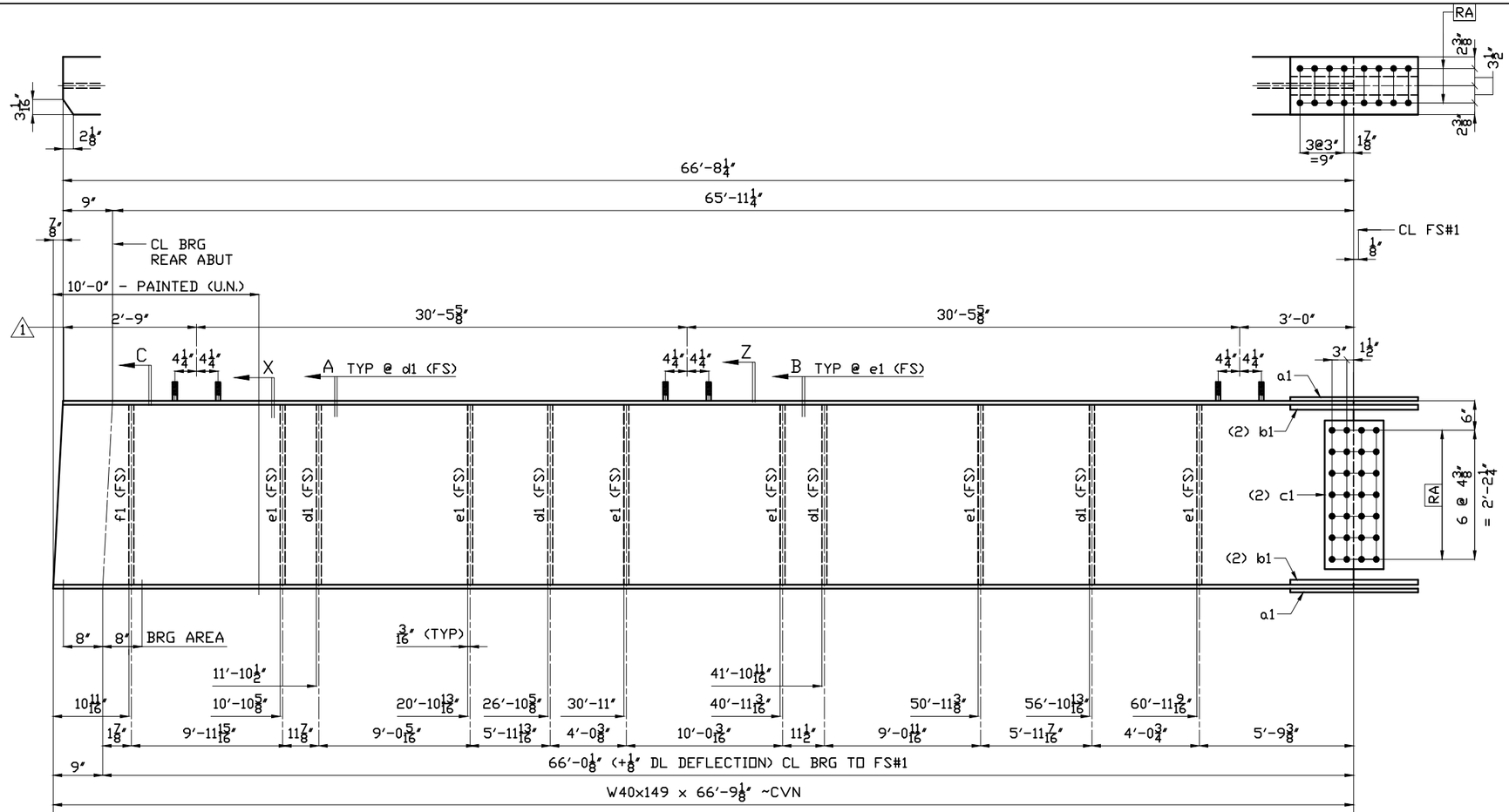
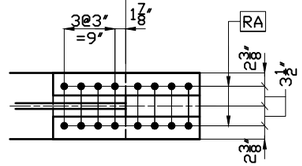
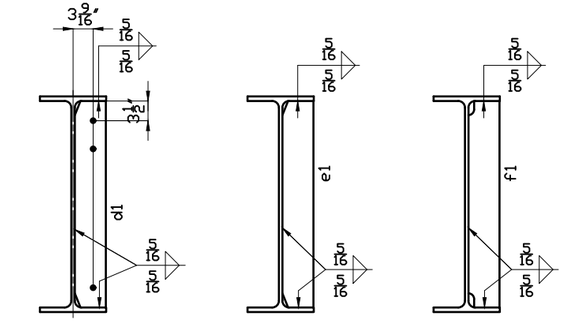


ONE ~STRINGER~ 8S3



BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		8S3	1	STRINGER		PAINT
				W40x149 x 66'-9 1/8" CVN		
		a1	2	PL 3/4" x 11 3/4" x 2'-2 CVN		
		b1	4	PL 1" x 4" x 2'-2" CVN		
		c1	2	PL 1/2" x 30 1/4" x 1'-0 1/4" CVN		
		d1	4	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		e1	6	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		f1	1	PL 3/8" x 5 1/2" x 3'-0 5/8"		
			6	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428	1	

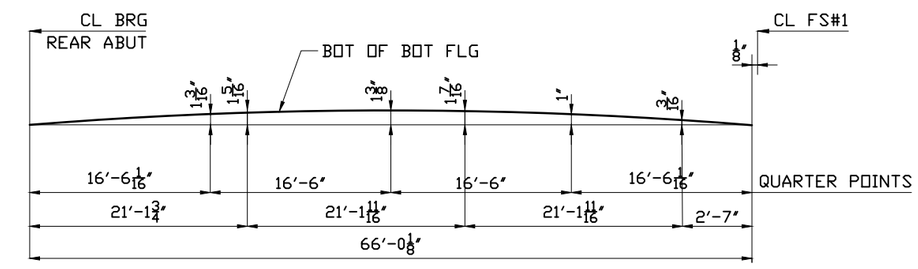


SECTION A

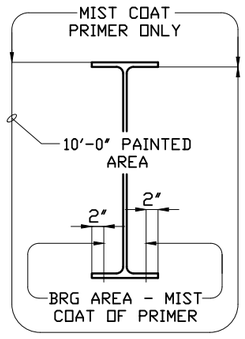
SECTION B

SECTION C

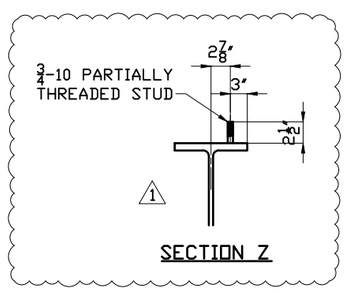
11/16"ø HOLES FOR
5/8"ø BOLTS



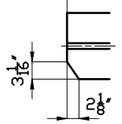
CAMBER DIAGRAM



SECTION X



SECTION Z



FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER SEE GN1AB
INTERMEDIATE NONE
FINISH NONE
TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

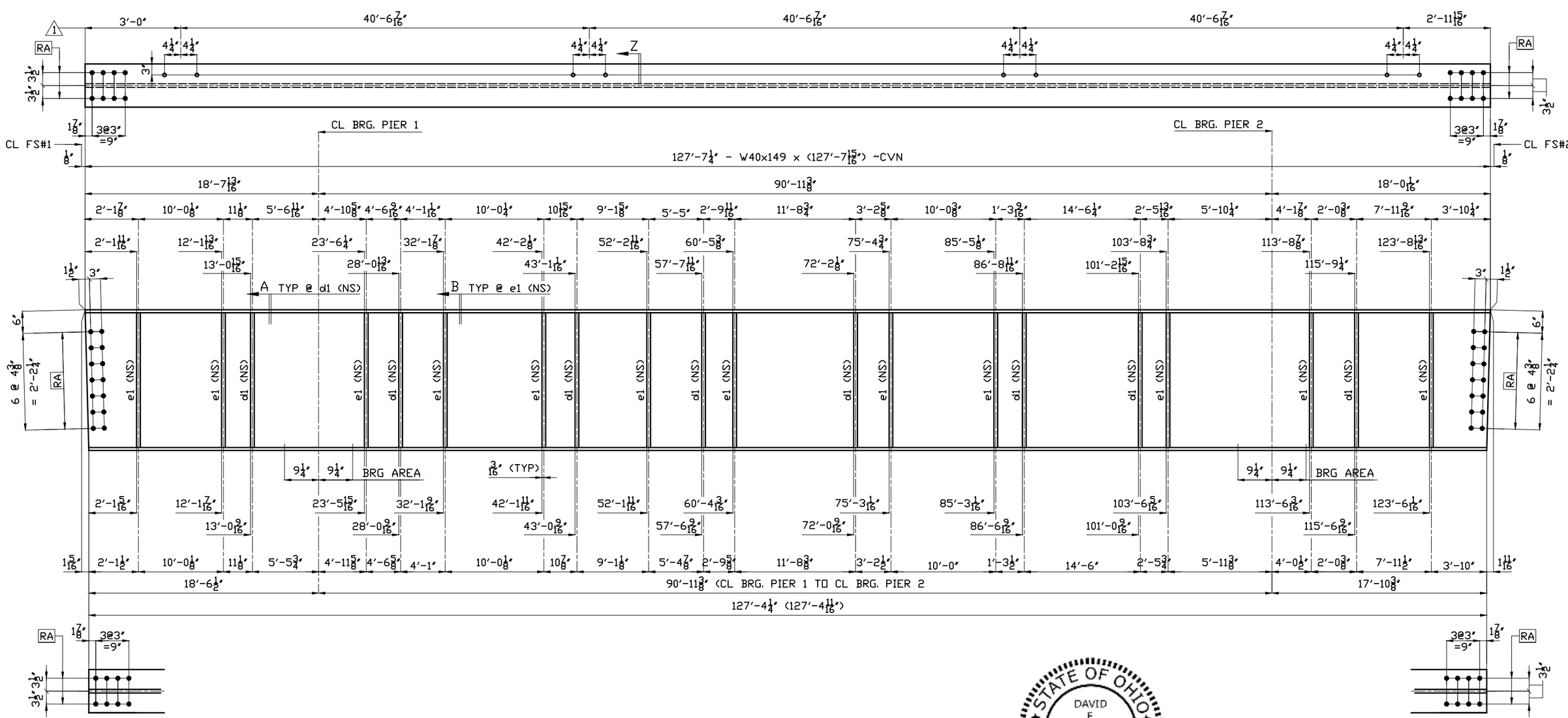
DETAIL OF STRINGER 8S3
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 8

CONT. NO. 19-782



ONE ~STRINGER~ 9S1

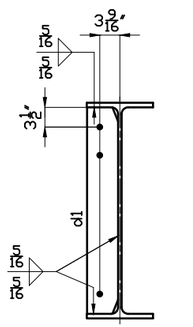
WORK THIS DWG. WITH DWG. 9B

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

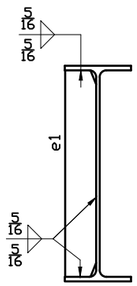
HORIZONTAL DIMENSIONS ARE ALL CHORD DIMENSION AND NOT ALONG BEAM CAMBER ARC

DIMENSIONS NOTED THUS: (127'-4 11/16") ARE BOT & TOP FLG LENGTHS ALONG THE CAMBER ARC

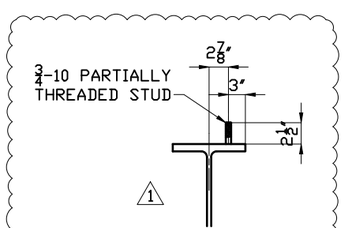


SECTION A

11/16"ø HOLES FOR 5/8"ø BOLTS



SECTION B



SECTION Z

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER NONE
INTERMEDIATE NONE
FINISH NONE

TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

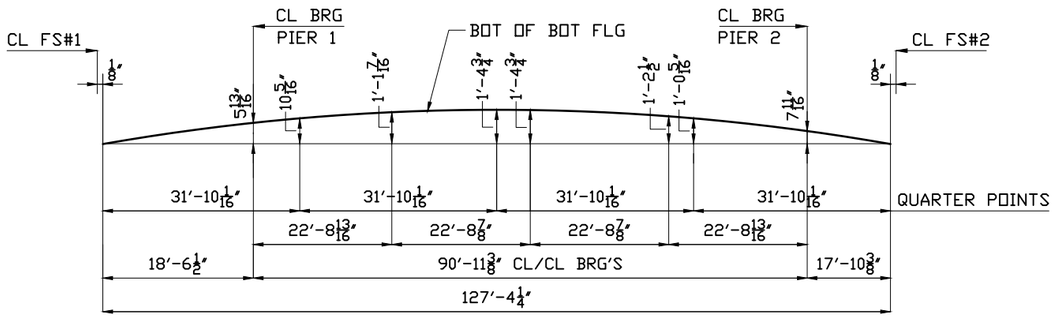
DETAIL OF STRINGER 9S1
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 9AB

CONT. NO. 19-782



CAMBER DIAGRAM

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		9S1	1	STRINGER		
				W40x149 x 127'-7 15/16" CVN		
		d1	8	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		e1	12	PL 3/8" x 5 1/2" x 3'-0 5/8"		
			8	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428	1	

WORK THIS DWG. WITH DWG. 9AB

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER NONE
INTERMEDIATE NONE
FINISH NONE
TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

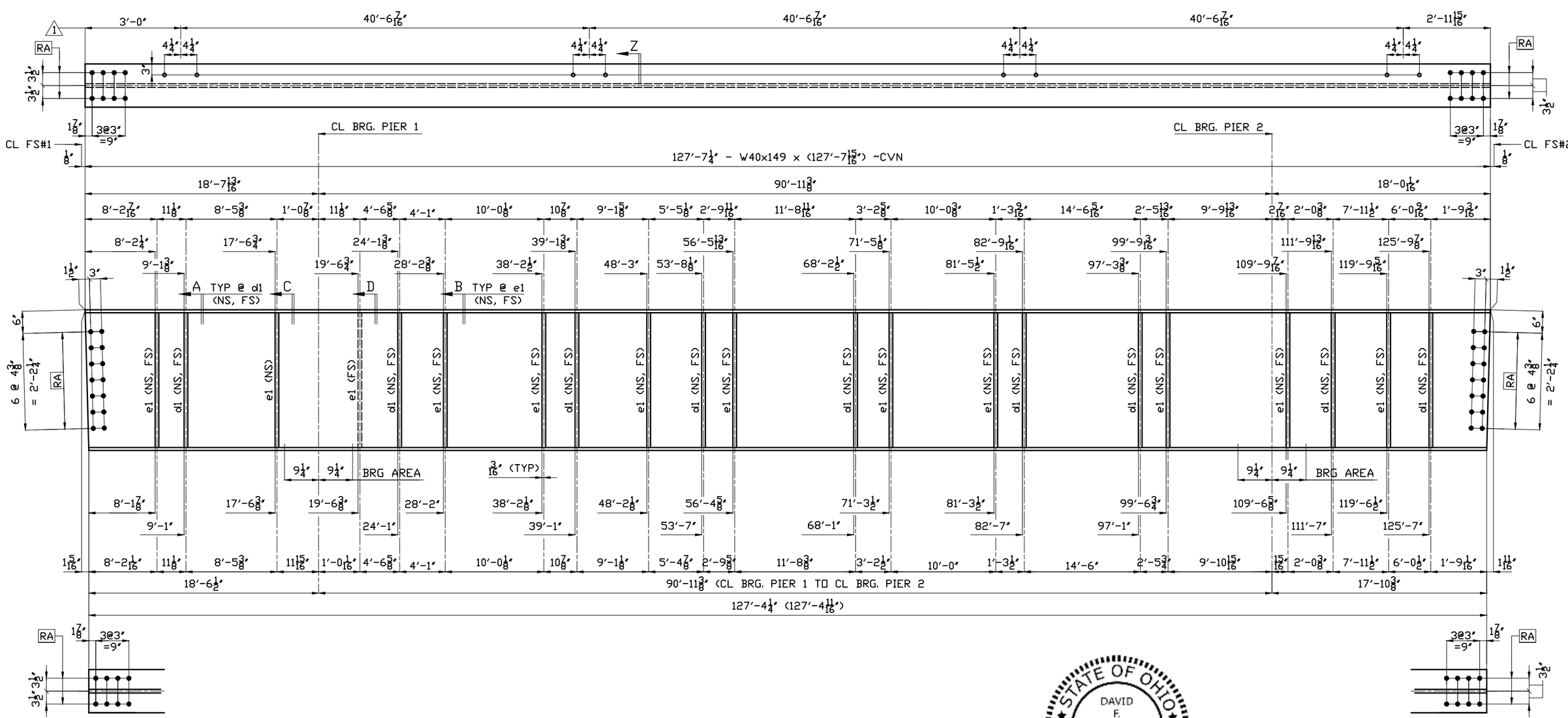
SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

DETAIL OF STRINGER 9S1
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 9B
CONT. NO. 19-782



ONE ~STRINGER~ 10S2

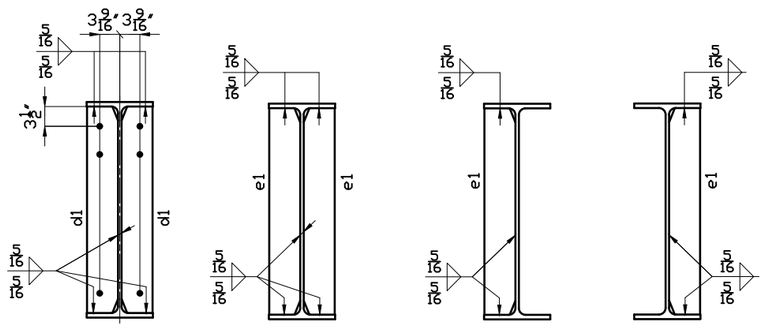
WORK THIS DWG. WITH DWG. 10B

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

HORIZONTAL DIMENSIONS ARE ALL CHORD DIMENSION AND NOT ALONG BEAM CAMBER ARC

DIMENSIONS NOTED THUS: (127'-4 11/16") ARE BOT & TOP FLG LENGTHS ALONG THE CAMBER ARC

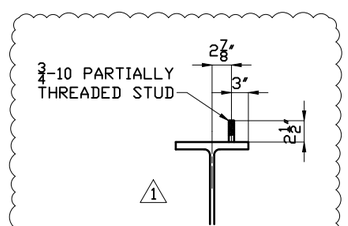


SECTION A

SECTION B

SECTION C

SECTION D



SECTION Z

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER NONE
INTERMEDIATE NONE
FINISH NONE

TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

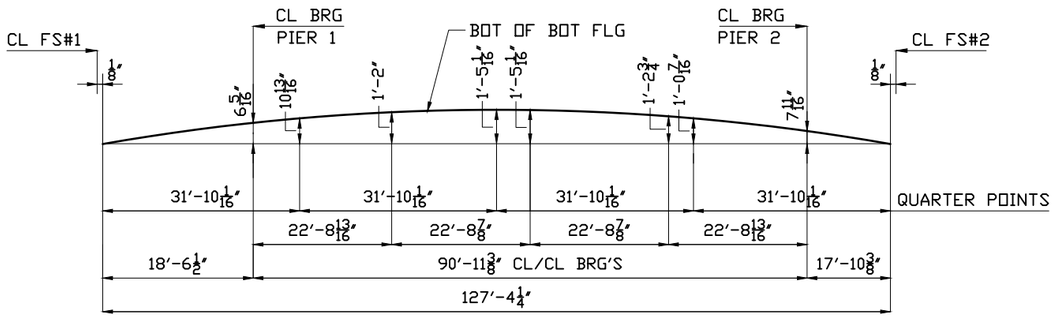
DETAIL OF STRINGER 10S2
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 10AB

CONT. NO. 19-782



CAMBER DIAGRAM

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		10S2	1	STRINGER		
				W40x149 x 127'-7 15/16" CVN		
		d1	18	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		e1	22	PL 3/8" x 5 1/2" x 3'-0 5/8"		
			8	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428	1	

WORK THIS DWG. WITH DWG. 10AB

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER NONE
INTERMEDIATE NONE
FINISH NONE

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

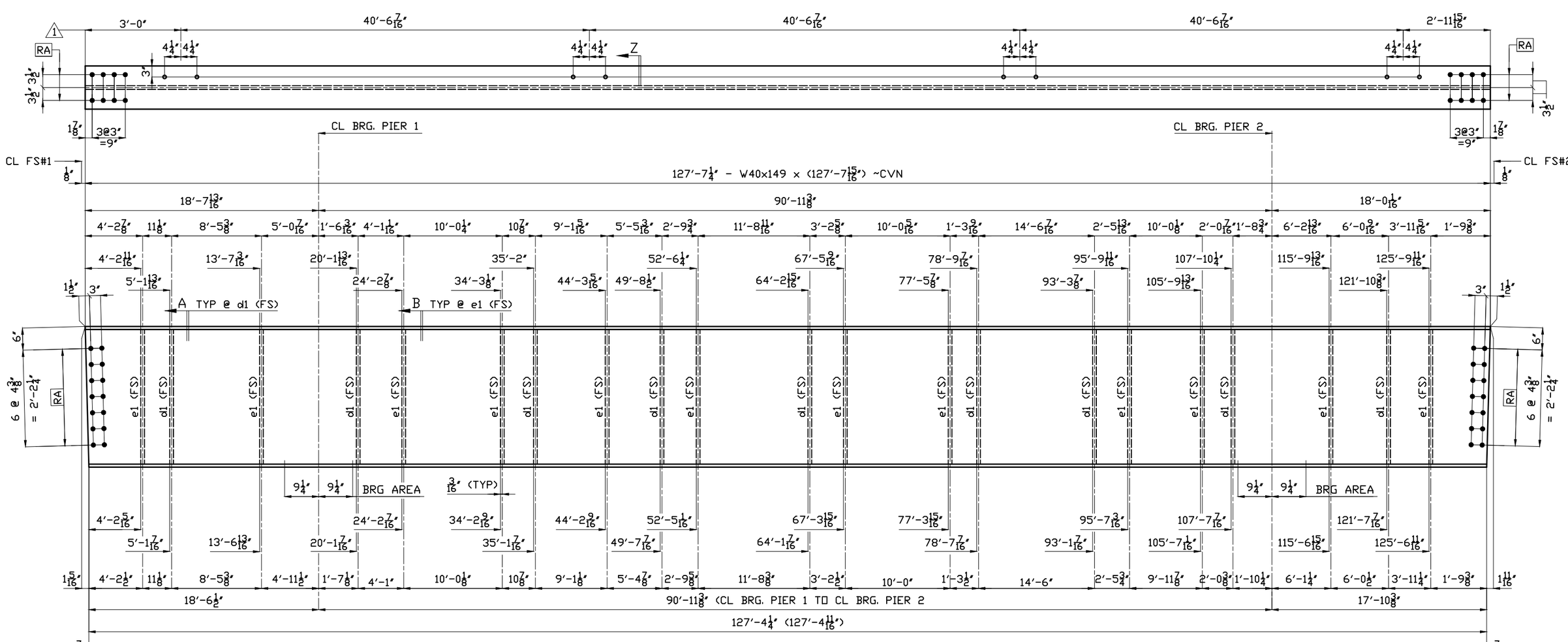
DETAIL OF STRINGER 10S2
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
2
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 10B

CONT. NO. 19-782



ONE ~STRINGER~ 11S3

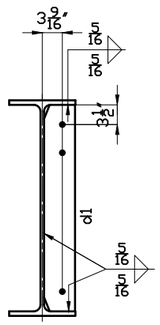
WORK THIS DWG. WITH DWG. 11B

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

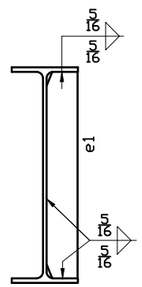
HORIZONTAL DIMENSIONS ARE ALL CHORD DIMENSION AND NOT ALONG BEAM CAMBER ARC

DIMENSIONS NOTED THUS: (127'-4 11/16") ARE BOT & TOP FLG LENGTHS ALONG THE CAMBER ARC



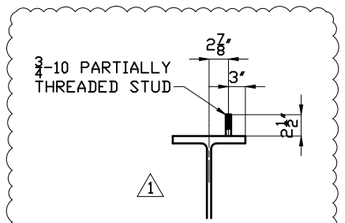
SECTION A

11/16"ø HOLES FOR
5/8"ø BOLTS



SECTION B

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER



SECTION Z

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER NONE
INTERMEDIATE NONE
FINISH NONE

TO SHOP:

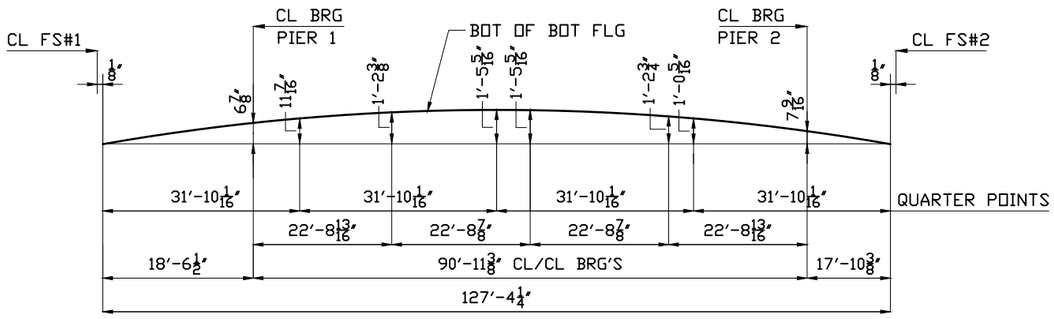
SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

DETAIL OF STRINGER 11S3
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS				
1	ADDED STUDS	6/18/20	DR. CCD-MC	DATE 2/20
2			CH. CCD-JB	DATE 2/20
3			APP.	DATE
4				

DWG. NO. 11AB

CONT. NO. 19-782



CAMBER DIAGRAM

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		11S3	1	STRINGER		
				W40x149 x 127'-7 15/16" CVN		
		d1	9	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		e1	12	PL 3/8" x 5 1/2" x 3'-0 5/8"		
			8	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428	(1)	

WORK THIS DWG. WITH DWG. 11AB

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER NONE
INTERMEDIATE NONE
FINISH NONE

TO SHOP:

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

SFI

SHANE FELTER INDUSTRIES

P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

DETAIL OF STRINGER 11S3

BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28

CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833

FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
2
3
4

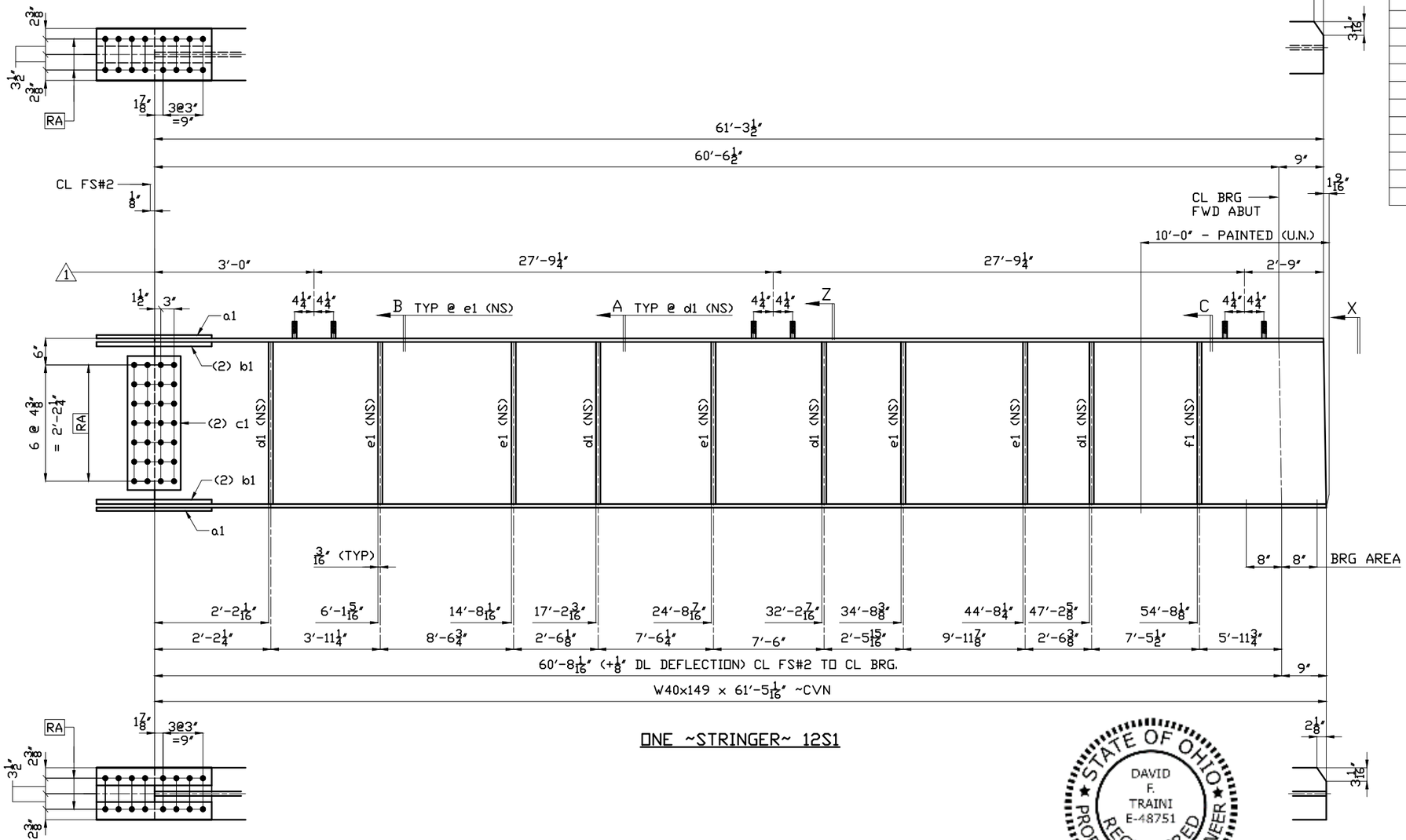
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 11B

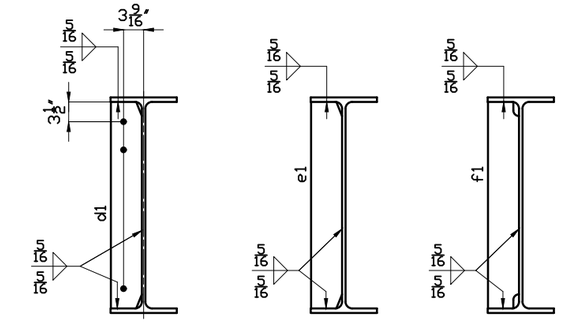
CONT. NO. 19-782

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		12S1	1	STRINGER		PAINT
				W40x149 x 61'-5 1/16" CVN		
		a1	2	PL 3/4" x 11 3/4" x 2'-2 CVN		
		b1	4	PL 1" x 4" x 2'-2" CVN		
		c1	2	PL 1/2" x 30 1/4" x 1'-0 1/4" CVN		
		d1	4	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		e1	5	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		f1	1	PL 3/8" x 5 1/2" x 3'-0 5/8"		
			6	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428	(1)	



ONE ~STRINGER~ 12S1

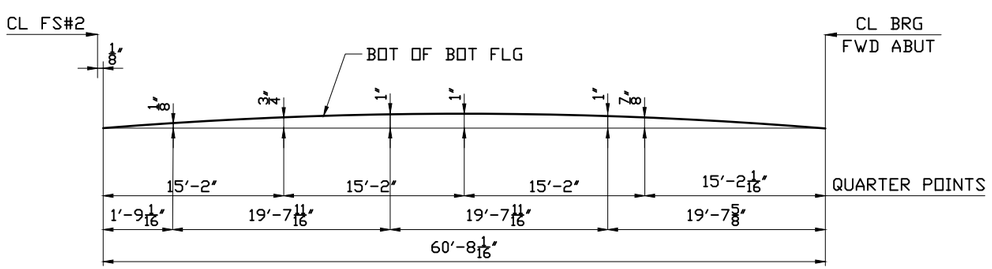


SECTION A

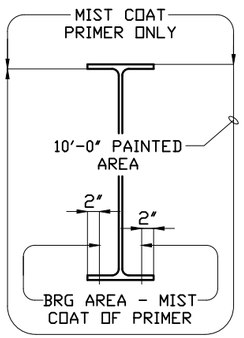
11/16"ø HOLES FOR
5/8"ø BOLTS

SECTION B

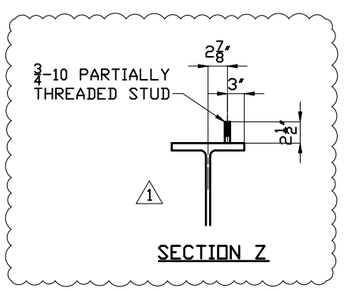
SECTION C



CAMBER DIAGRAM



SECTION X



SECTION Z

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED PROFESSIONAL ENGINEER

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER SEE GN1AB
INTERMEDIATE NONE
FINISH NONE

TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

DETAIL OF STRINGER 12S1
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED STUDS 6/18/20
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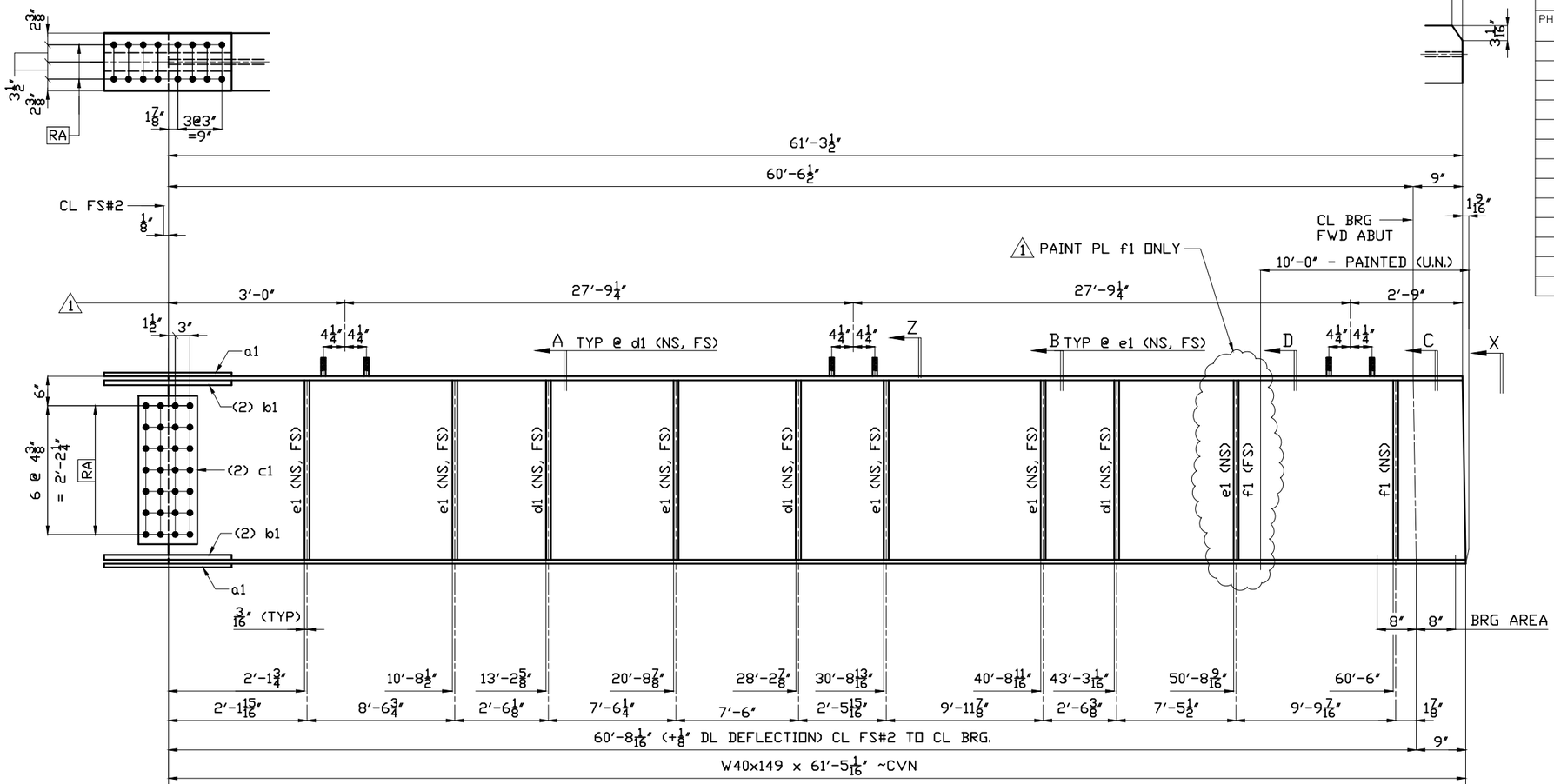
3
4

DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

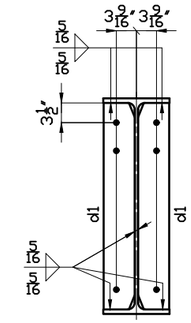
DWG. NO. 12
CONT. NO. 19-782

BILL OF MATERIAL

PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		13S2	1	STRINGER		PAINT
				W40x149 x 61'-5 1/16" CVN		
		a1	2	PL 3/4" x 11 3/4" x 2'-2 CVN		
		b1	4	PL 1" x 4" x 2'-2" CVN		
		c1	2	PL 1/2" x 30 1/4" x 1'-0 1/4" CVN		
		d1	6	PL 3/8" x 5 1/2" x 3'-0 3/8"		
		e1	11	PL 3/8" x 5 1/2" x 3'-0 3/8"		
		f1	2	PL 3/8" x 5 1/2" x 3'-0 3/8"		
			6	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428		

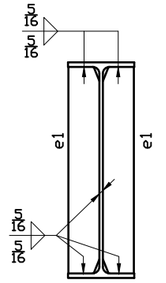


ONE ~STRINGER~ 13S2

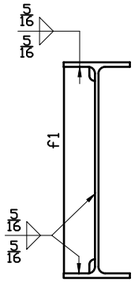


SECTION A

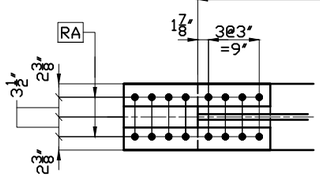
11/16"ø HOLES FOR 5/8"ø BOLTS

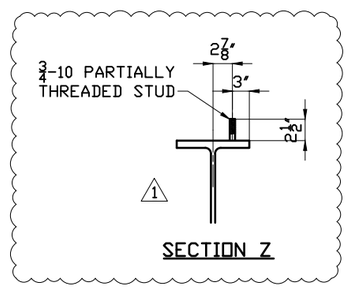


SECTION B

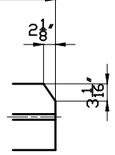


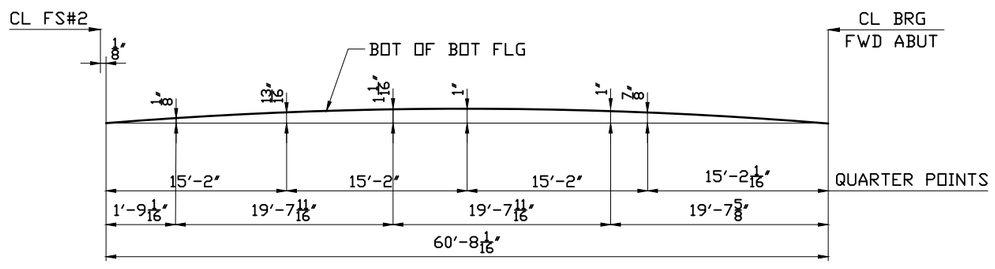
SECTION C



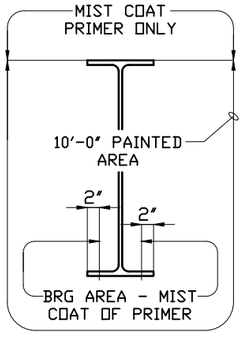


SECTION Z

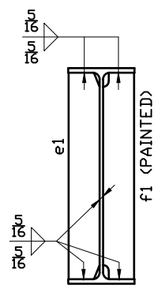




CAMBER DIAGRAM



SECTION X



1 SECTION D

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS: CLEANING SEE GN1AB
PRIMER SEE GN1AB
INTERMEDIATE NONE
FINISH NONE
TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLVANIA 15401

DETAIL OF STRINGER 13S2
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS
1 ADDED PAINT NOTE/STUDS 6/17/20
2
3
4

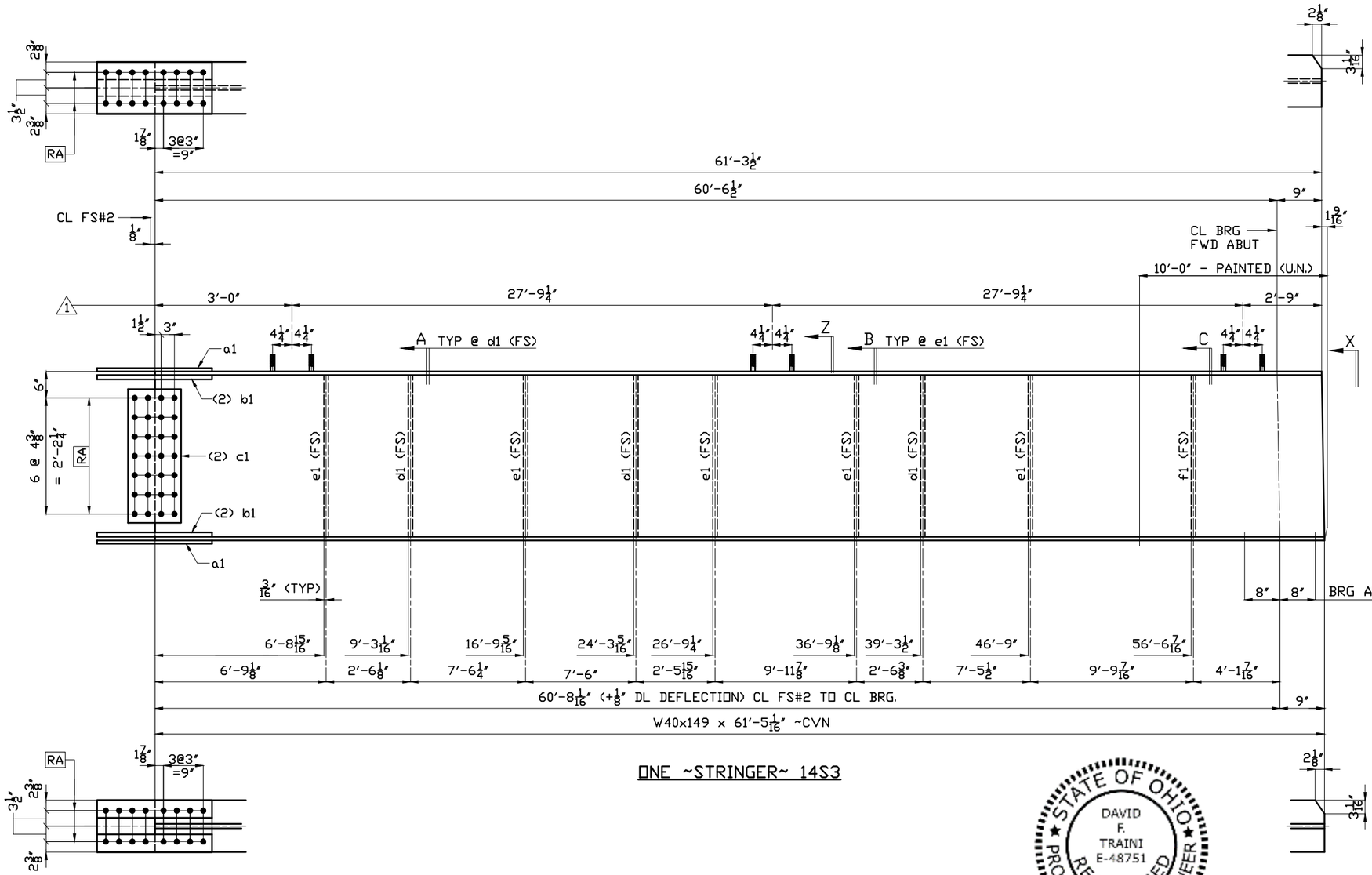
DR. CCD-MC DATE 2/20
CH. CCD-JB DATE 2/20
APP. DATE

DWG. NO. 13

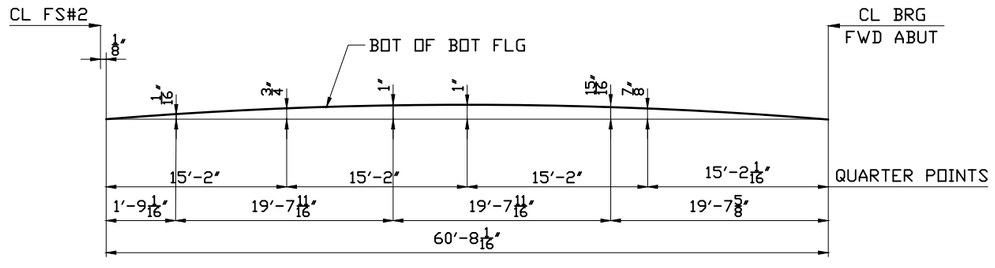
CONT. NO. 19-782

BILL OF MATERIAL

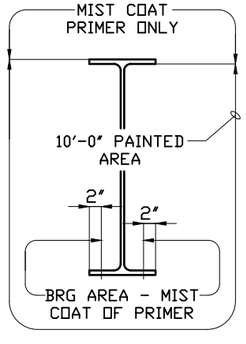
PHASE 1	PHASE 2	ASS'Y MARK	NO. REQ'D	DESCRIPTION	WEIGHT	NOTES
		14S3	1	STRINGER		PAINT
				W40x149 x 61'-5 1/16" CVN		
		a1	2	PL 3/4" x 11 3/4" x 2'-2 CVN		
		b1	4	PL 1" x 4" x 2'-2" CVN		
		c1	2	PL 1/2" x 30 1/4" x 1'-0 1/4" CVN		
		d1	3	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		e1	5	PL 3/8" x 5 1/2" x 3'-0 5/8"		
		f1	1	PL 3/8" x 5 1/2" x 3'-0 5/8"		
			6	STUD 3/4-10 x 2 1/2" UNC NELSON #101017428 (1)		



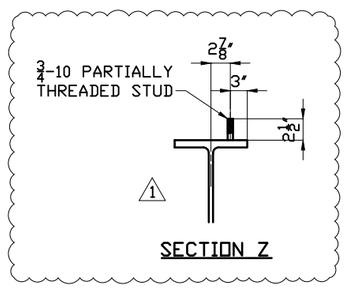
ONE ~STRINGER~ 14S3



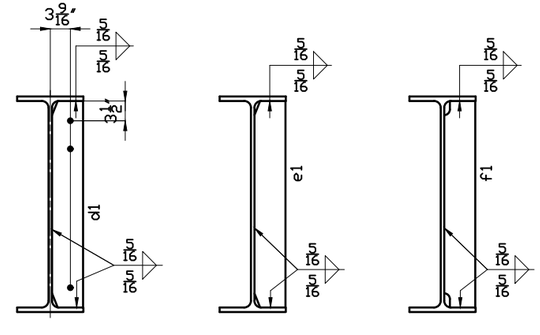
CAMBER DIAGRAM



SECTION X



SECTION Z



SECTION A
11/16"ø HOLES FOR 5/8"ø BOLTS

SECTION B

SECTION C

FOR SHOP NOTES SEE DWG. GN1AB/B

ALL STEEL SHALL BE AASHTO M270 GR 50W

GENERAL CONTRACTOR: KOKOSING D&B

TOTAL WEIGHT		

NOTES: 1 1/16" DIA. HOLES UNLESS NOTED 1" DIA. BOLTS UNLESS NOTED

PAINT SPECS:

CLEANING	SEE GN1AB
PRIMER	SEE GN1AB
INTERMEDIATE	NONE
FINISH	NONE

TO SHOP:

SHANE FELTER INDUSTRIES
P.O. BOX 2022 • ROUTE 51 • UNIONTOWN PENNSYLANIA 15401

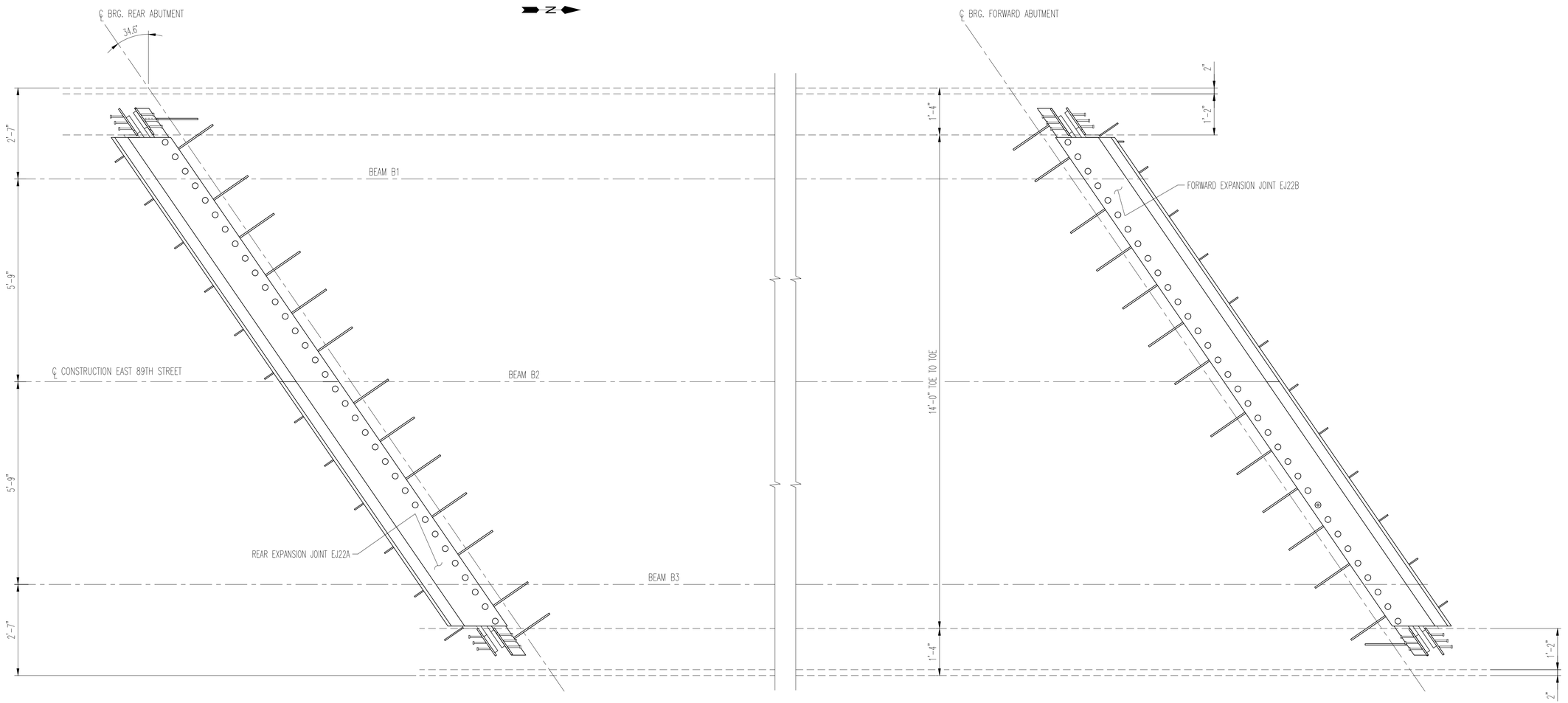
DETAIL OF STRINGER 14S3
BU-25 E 89TH ST PEDESTRIAN BRIDGE CUY-IR490/SR010-2.09/19.28
CITY OF CLEVELAND, CONSTRUCTION PROJECT #17-3000 PID #96833
FED. PROJ.# E140 (249) CUYAHOGA COUNTY, OHIO

REVISIONS				
1	ADDED STUDS	6/18/20	DR. CCD-MC	DATE 2/20
2			CH. CCD-JB	DATE 2/20
3			APP.	DATE
4				

DWG. NO. 14

CONT. NO. 19-782

STATE OF OHIO
DAVID F. TRAINI
E-48751
REGISTERED
PROFESSIONAL ENGINEER



EXPANSION JOINT LOCATION PLAN

TOTAL PAY LENGTH: 38.66' FT.

NOTES:

SEE SHEET 2 FOR DETAIL OF REAR EXPANSION JOINT EJ22A
SEE SHEET 3 FOR DETAIL OF FORWARD EXPANSION JOINT EJ22B
SEE SHEET 7 FOR EXPANSION JOINT DETAILS, GENERAL NOTES & BILL OF MATERIAL

AISC CERTIFIED FABRICATOR

BRIDGE - INTERMEDIATE (MAJOR)
FRACTURE CRITICAL ENDORSEMENT
SOPHISTICATED PAINT ENDORSEMENT

REV. No.	REVISION

SHOP INSPECTED BY:

APPROVAL

KOKOSING CONSTRUCTION

- [x] NO EXCEPTIONS TAKEN
- [ ] MAKE CORRECTIONS AS NOTED
- [ ] REVISE AND RESUBMIT
- [ ] REJECTED
- [ ] FOR INFORMATION ONLY

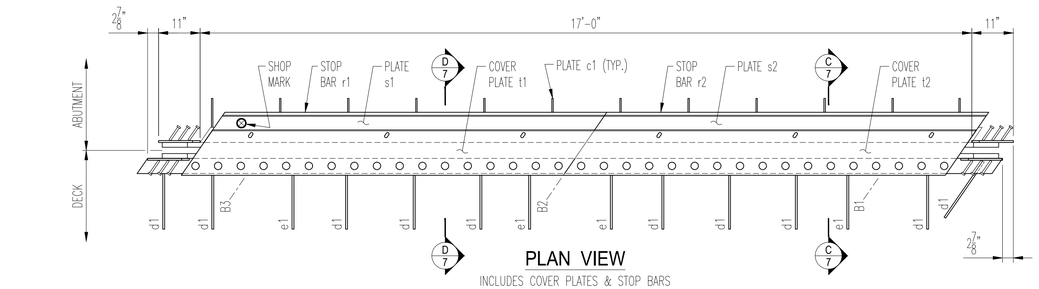
REVIEW IS FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS
NO RESPONSIBILITY ASSUMED FOR CORRECTNESS OF DIMENSIONS OR DETAILS

BY mwf DATE 9/28/2020

Ohio Structures Inc.
4030 Boardman Canfield Road, Ste. 200 D
Canfield, Ohio 44406
(330) 533-0084 Fax: (330) 533-0191

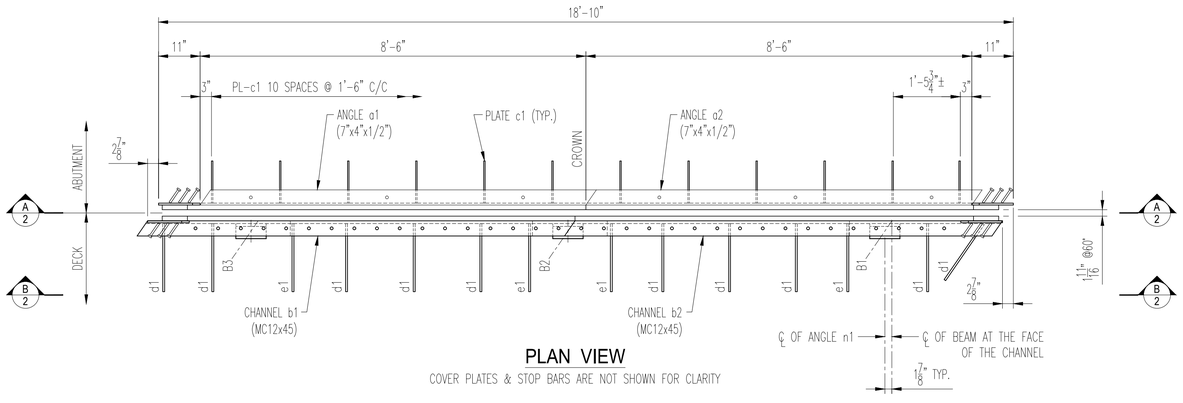
OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE: CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

SCALE: N.T.S.	Kokosing Construction	DRAWN: JDC
DATE: 08/20		CHECK: MI
EXPANSION JOINT LOCATION PLAN		
REF NO.: 17 (BU25)		ITEM NO.: 516
ODOT PROJ. NO.: 173000	CUYAHOGA COUNTY	DWG. NO.: E1
OSI PROJ. NO.: 19-22	PID NO.: 96833 SFN: TBD	1 OF 7



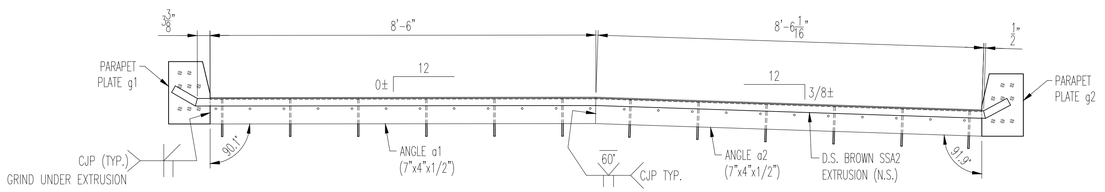
PLAN VIEW

INCLUDES COVER PLATES & STOP BARS

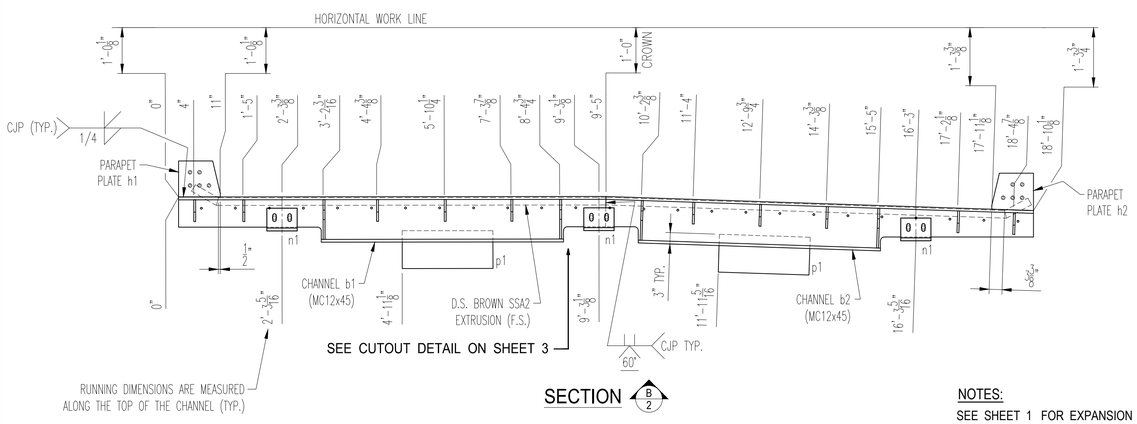


PLAN VIEW

COVER PLATES & STOP BARS ARE NOT SHOWN FOR CLARITY

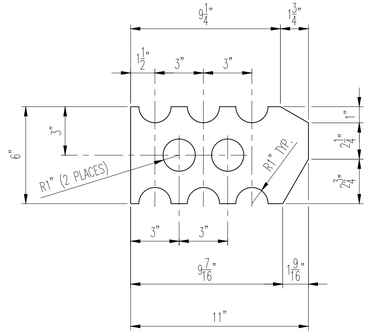


SECTION A/2



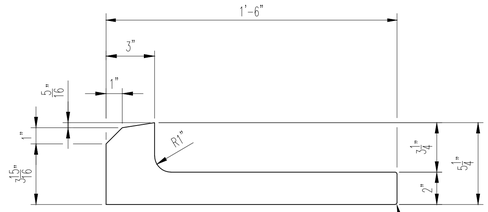
SECTION B/2

1 - REAR EXPANSION JOINT EJ22A



24 - Plates c1

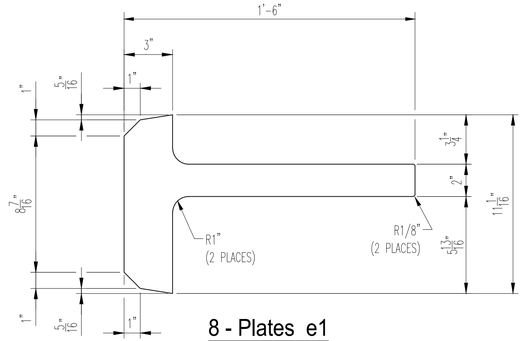
MATERIAL: 3/8" PLATE



20 - Plates d1

MATERIAL: 1/2" PLATE

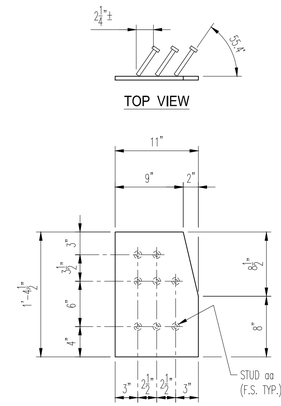
ADJUST SIZE TO FIT INSIDE THE MC12x45 CHANNEL



8 - Plates e1

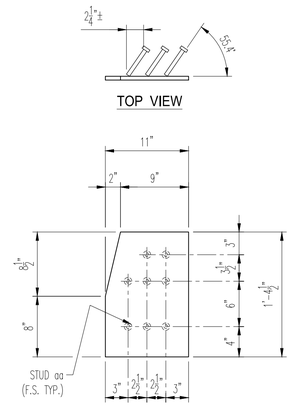
MATERIAL: 1/2" PLATE

ADJUST SIZE TO FIT INSIDE THE MC12x45 CHANNEL



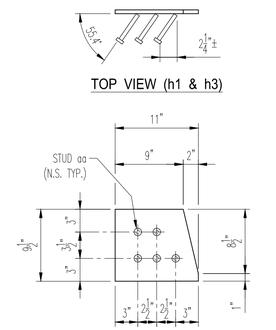
2 - Parapet Plates g1

MATERIAL: 1/2" PLATE



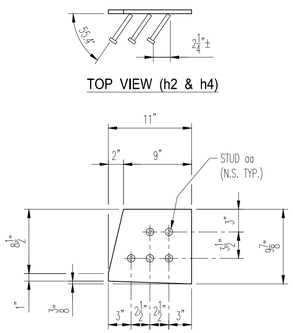
2 - Parapet Plates g2

MATERIAL: 1/2" PLATE



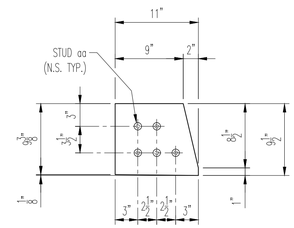
1 - Parapet Plate h1

MATERIAL: 1/2" PLATE



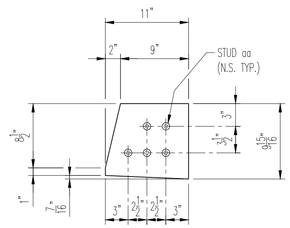
1 - Parapet Plate h2

MATERIAL: 1/2" PLATE



1 - Parapet Plate h3

MATERIAL: 1/2" PLATE



1 - Parapet Plate h4

MATERIAL: 1/2" PLATE

PAY LENGTH EXJ22A: 19.33 FT.

AISC CERTIFIED FABRICATOR

BRIDGE - INTERMEDIATE (MAJOR)
FRACTURE CRITICAL ENDORSEMENT
SOPHISTICATED PAINT ENDORSEMENT

NOTES:

SEE SHEET 1 FOR EXPANSION JOINT LOCATION PLAN
SEE SHEET 4 FOR CHANNEL AND ANGLE DETAILS
SEE SHEET 6 FOR COVER PLATE DETAILS
SEE SHEET 7 FOR EXPANSION JOINT DETAILS & BILL OF MATERIAL

REV. No.	REVISION

SHOP INSPECTED BY:

APPROVAL

KOKOSING CONSTRUCTION

- ☑ NO EXCEPTIONS TAKEN
- ☐ MAKE CORRECTIONS AS NOTED
- ☐ REVISE AND RESUBMIT
- ☐ REJECTED
- ☐ FOR INFORMATION ONLY

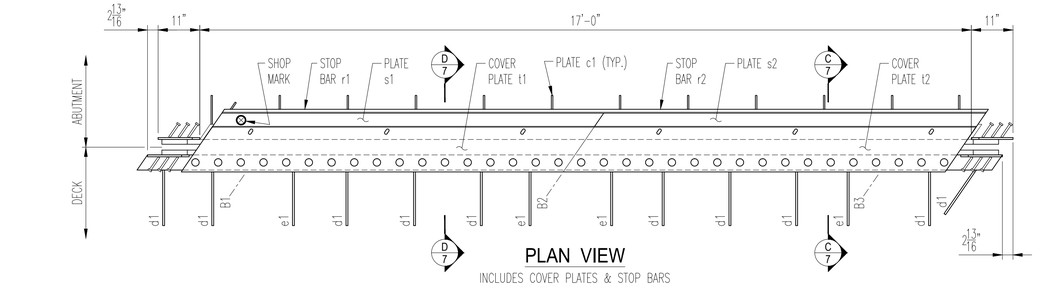
REVIEW IS FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS
NO RESPONSIBILITY ASSUMED FOR CORRECTNESS OF DIMENSIONS OR DETAILS

BY mwf DATE 9/28/2020

Ohio Structures Inc.
4030 Boardman Canfield Road, Ste. 200 D
Canfield, Ohio 44406
(330) 533-0084 Fax: (330) 533-0191

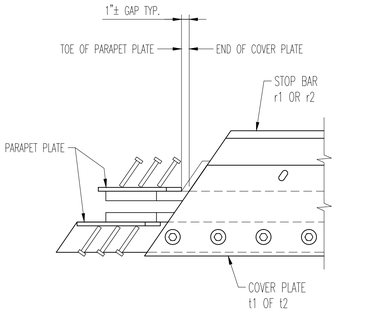
OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE: CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

SCALE: N.T.S.	Kokosing Construction	DRAWN: JDC
DATE: 08/20		CHECK: MI
DETAIL OF REAR EXPANSION JOINT EJ22A		
REF NO.: 17 (BU25)		ITEM NO.: 516
ODOT PROJ. NO.: 173000	CUYAHOGA COUNTY	DWG. NO.: D1
OSI PROJ. NO.: 19-22	PID NO.: 96833 SFN: TBD	2 OF 7

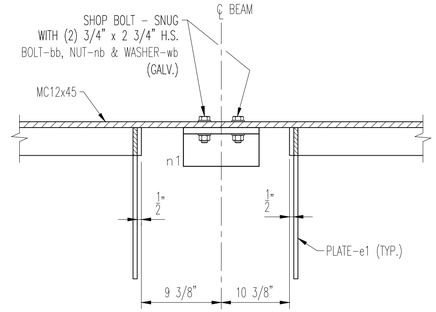


PLAN VIEW

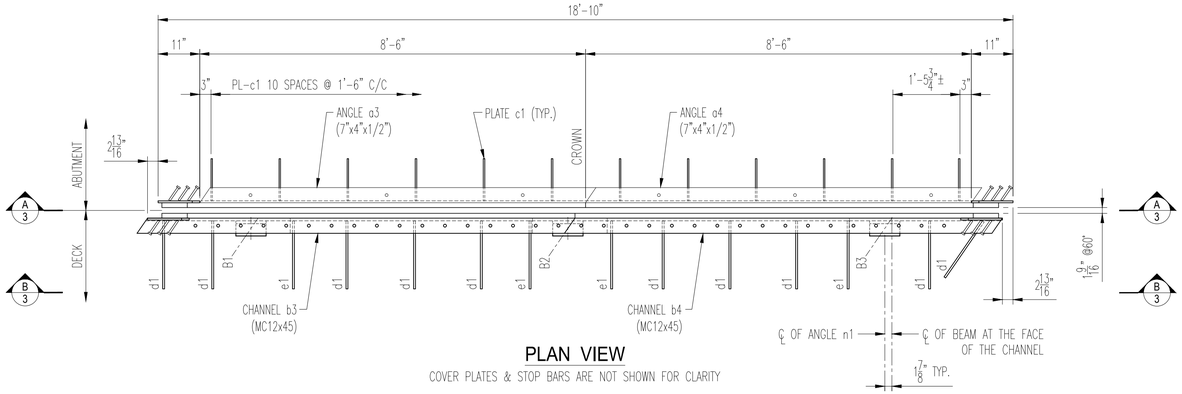
INCLUDES COVER PLATES & STOP BARS



TYPICAL DETAIL AT THE PARAPET PLATES

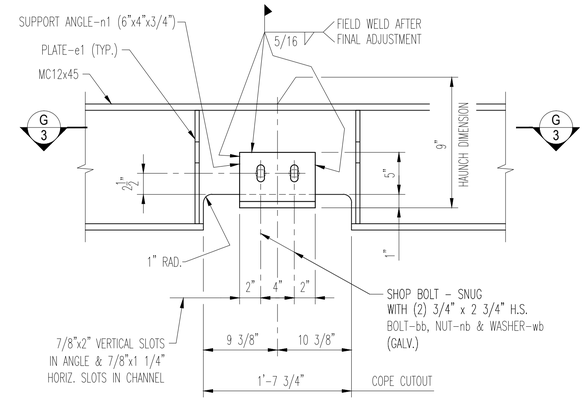


SECTION G/3

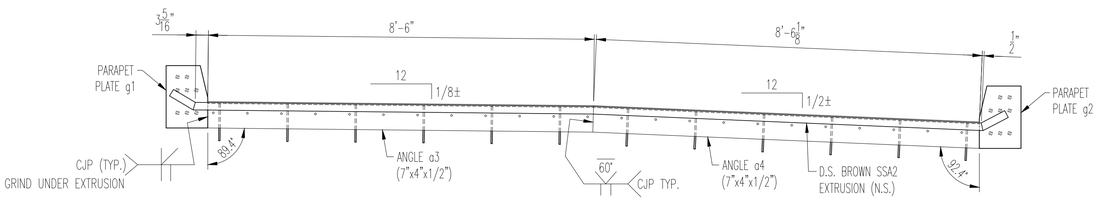


PLAN VIEW

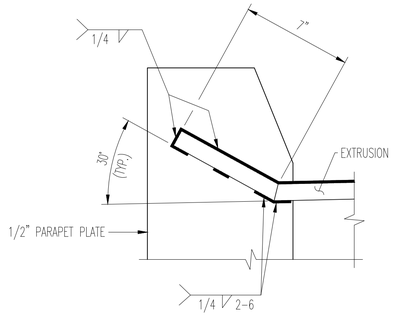
COVER PLATES & STOP BARS ARE NOT SHOWN FOR CLARITY



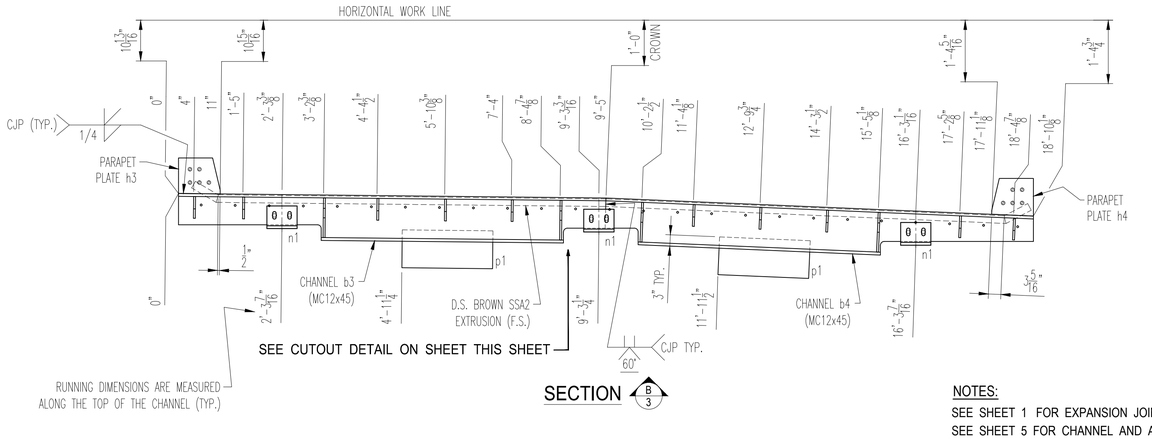
CHANNEL CUTOUT DETAIL @ SUPPORT ANGLE - n1



SECTION A/3



TYPICAL PARAPET WELD DETAIL



SECTION B/3

1 - FORWARD EXPANSION JOINT EJ22B

NOTES:

SEE SHEET 1 FOR EXPANSION JOINT LOCATION PLAN
SEE SHEET 5 FOR CHANNEL AND ANGLE DETAILS
SEE SHEET 6 FOR COVER PLATE DETAILS
SEE SHEET 7 FOR EXPANSION JOINT DETAILS & BILL OF MATERIAL

REV. No.	REVISION
SHOP INSPECTED BY:	

AISC CERTIFIED FABRICATOR

BRIDGE - INTERMEDIATE (MAJOR)
FRACTURE CRITICAL ENDORSEMENT
SOPHISTICATED PAINT ENDORSEMENT

APPROVAL

KOKOSING CONSTRUCTION

- ☑ NO EXCEPTIONS TAKEN
- ☐ MAKE CORRECTIONS AS NOTED
- ☐ REVISE AND RESUBMIT
- ☐ REJECTED
- ☐ FOR INFORMATION ONLY

REVIEW IS FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS
NO RESPONSIBILITY ASSUMED FOR CORRECTNESS OF DIMENSIONS OR DETAILS

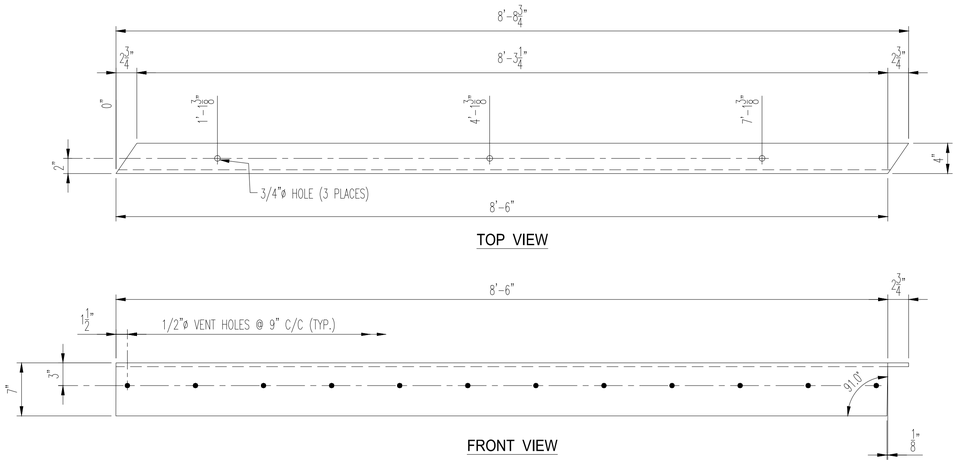
BY rnwf DATE 9/28/2020

PAY LENGTH EXJ22B: 19.33 FT.

Ohio Structures Inc.
4030 Boardman Canfield Road, Ste. 200 D
Canfield, Ohio 44406
(330) 533-0084 Fax: (330) 533-0191

OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE: CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

SCALE: N.T.S.	Kokosing Construction	DRAWN: JDC
DATE: 08/20		CHECK: MI
DETAIL OF FORWARD EXPANSION JOINT EJ22B		
REF NO.: 17 (BU25)		ITEM NO.: 516
ODOT PROJ. NO.: 173000	CUYAHOGA COUNTY	DWG. NO.: D2
OSI PROJ. NO.: 19-22	PID NO.: 96833 SFN: TBD	3 OF 7

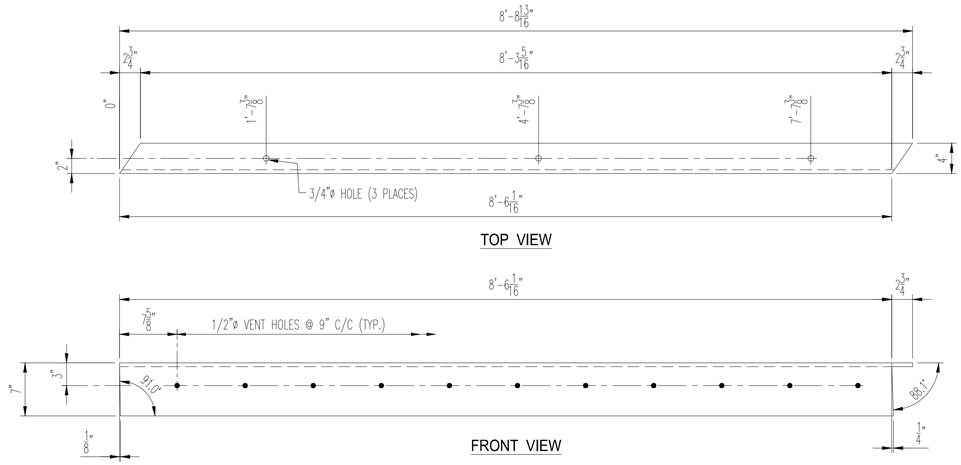


TOP VIEW

FRONT VIEW

1 - Angle a1

MATERIAL: 7"x4"X1/2" ANGLE



TOP VIEW

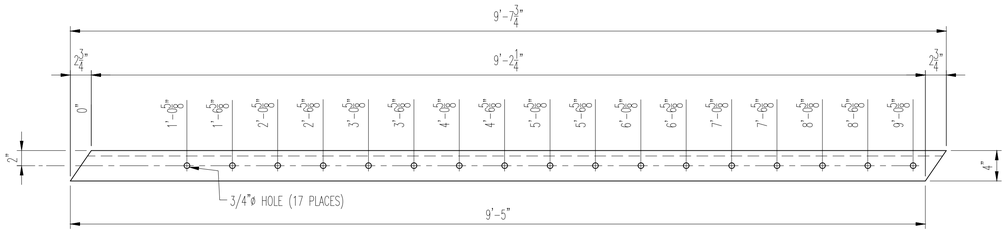
FRONT VIEW

1 - Angle a2

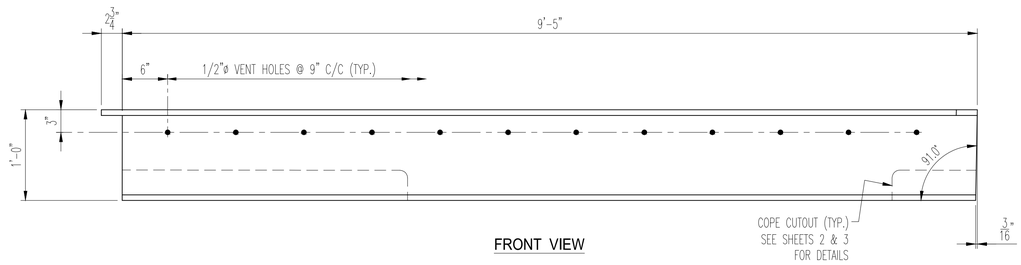
MATERIAL: 7"x4"X1/2" ANGLE

SHOP NOTE:

THE 3/4"Ø HOLES IN THE TOP OF THE CHANNELS & ANGLES MUST MATCH THE HOLE & SLOT LOCATIONS IN THE COVER PLATES t1 & t2 AND PLATES s1, s2, u1 & u2 ON SHEET 6.
VERIFY PRIOR TO DRILLING OR MATCH MARK AND DRILL.



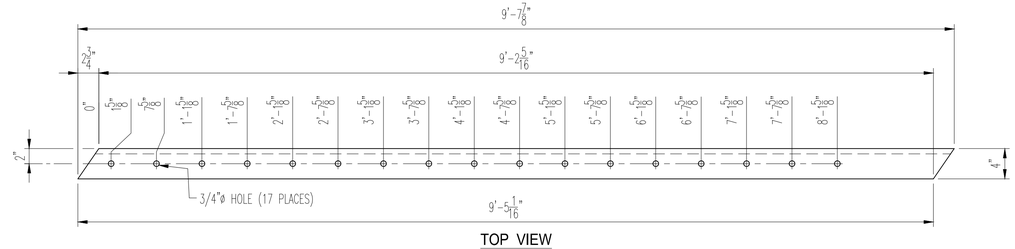
TOP VIEW



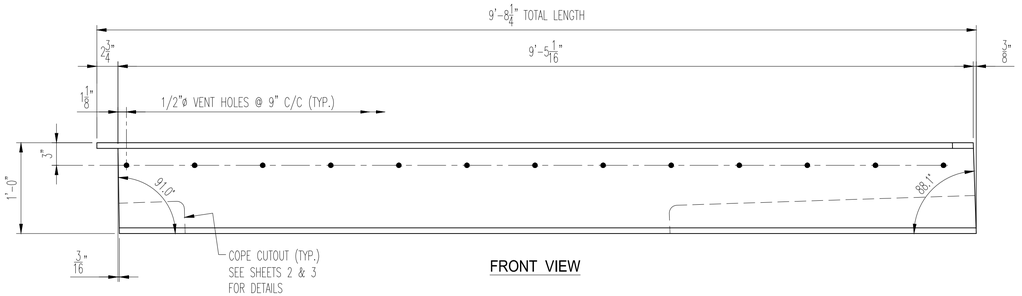
FRONT VIEW

1 - Channel b1

MATERIAL: MC12x45
THE CHANNEL IS SHOWN PRIOR TO COPING



TOP VIEW



FRONT VIEW

1 - Channel b2

MATERIAL: MC12x45
THE CHANNEL IS SHOWN PRIOR TO COPING

NOTES:

SEE SHEET 2 FOR THE LOCATIONS OF THESE PARTS
SEE SHEET 7 FOR EXPANSION JOINT DETAILS, GENERAL NOTES & BILL OF MATERIAL

AISC CERTIFIED FABRICATOR

BRIDGE - INTERMEDIATE (MAJOR)
FRACTURE CRITICAL ENDORSEMENT
SOPHISTICATED PAINT ENDORSEMENT

REV. No.	REVISION

SHOP INSPECTED BY:

APPROVAL

KOKOSING CONSTRUCTION

- [x] NO EXCEPTIONS TAKEN
- [ ] MAKE CORRECTIONS AS NOTED
- [ ] REVISE AND RESUBMIT
- [ ] REJECTED
- [ ] FOR INFORMATION ONLY

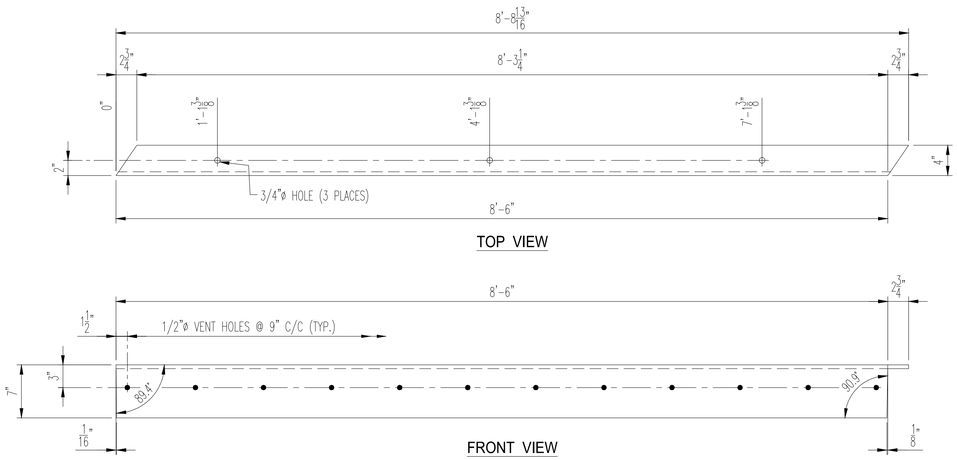
REVIEW IS FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS.
NO RESPONSIBILITY ASSUMED FOR CORRECTNESS OF DIMENSIONS OR DETAILS

BY mwf DATE 9/28/2020

Ohio Structures Inc.
4030 Boardman Canfield Road, Ste. 200 D
Canfield, Ohio 44406
(330) 533-0084 Fax: (330) 533-0191

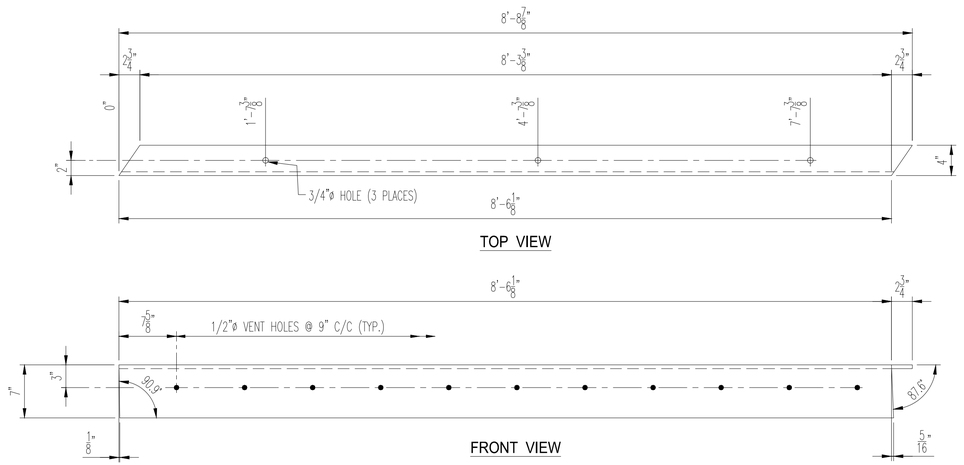
OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE: CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

SCALE: N.T.S.	Kokosing Construction	DRAWN: JDC
DATE: 08/20		CHECK: MI
ANGLE & CHANNEL DETAILS (REAR EXPANSION JOINT EJ22A)		
REF NO.: 17 (BU25)		ITEM NO.: 516
ODOT PROJ. NO.: 173000	CUYAHOGA COUNTY	DWG. NO.: D3
OSI PROJ. NO.: 19-22	PID NO.: 96833 SFN: TBD	4 OF 7



1 - Angle a3

MATERIAL: 7"x4"X1/2" ANGLE

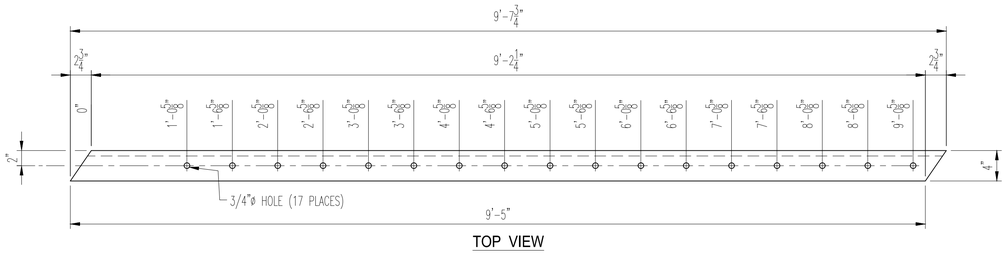


1 - Angle a4

MATERIAL: 7"x4"X1/2" ANGLE

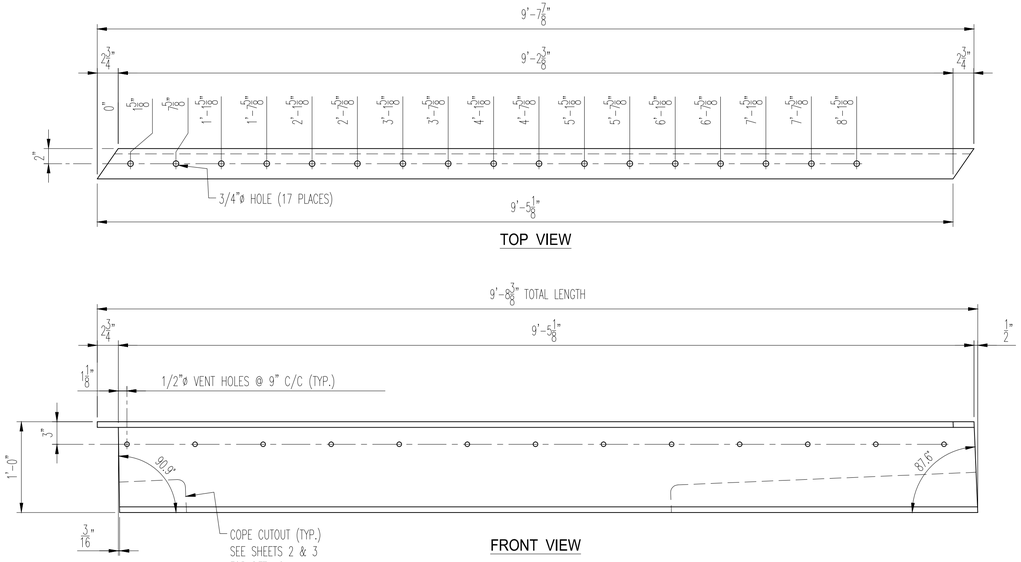
SHOP NOTE:

THE 3/4"Ø HOLES IN THE TOP OF THE CHANNELS & ANGLES MUST MATCH THE HOLE & SLOT LOCATIONS IN THE COVER PLATES t1 & t2 AND PLATES s1, s2, u1 & u2 ON SHEET 6.
VERIFY PRIOR TO DRILLING OR MATCH MARK AND DRILL.



1 - Channel b3

MATERIAL: MC12x45
THE CHANNEL IS SHOWN PRIOR TO COPING



1 - Channel b4

MATERIAL: MC12x45
THE CHANNEL IS SHOWN PRIOR TO COPING

NOTES:

SEE SHEET 3 FOR THE LOCATIONS OF THESE PARTS
SEE SHEET 7 FOR EXPANSION JOINT DETAILS, GENERAL NOTES & BILL OF MATERIAL

AISC CERTIFIED FABRICATOR

BRIDGE - INTERMEDIATE (MAJOR)
FRACTURE CRITICAL ENDORSEMENT
SOPHISTICATED PAINT ENDORSEMENT

REV. No.	REVISION

SHOP INSPECTED BY:

APPROVAL

KOKOSING CONSTRUCTION

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BY mwf DATE 9/28/2020

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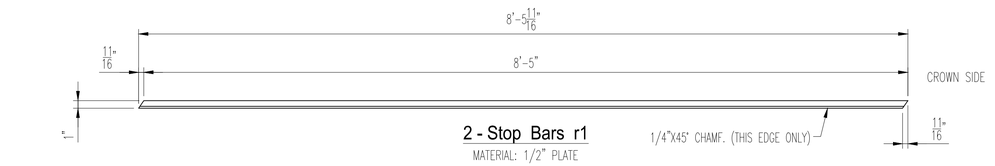
4030 Boardman Canfield Road, Ste. 200 D
Canfield, Ohio 44406
(330) 533-0084 Fax: (330) 533-0191

OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE: CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

SCALE: N.T.S.	Kokosing Construction	DRAWN: JDC
DATE: 08/20		CHECK: MI

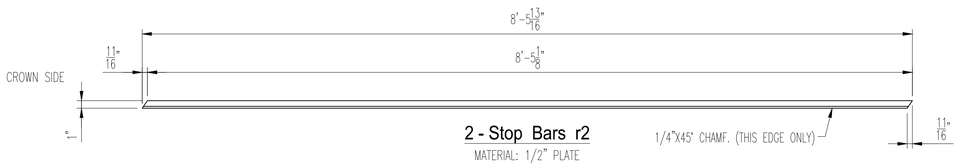
ANGLE & CHANNEL DETAILS (FORWARD EXPANSION JOINT EJ22B)

REF NO.: 17 (BU25)		ITEM NO.: 516
ODOT PROJ. NO.: 173000	CUYAHOGA COUNTY	DWG. NO.: D4
OSI PROJ. NO.: 19-22	PID NO.: 96833 SFN: TBD	5 OF 7



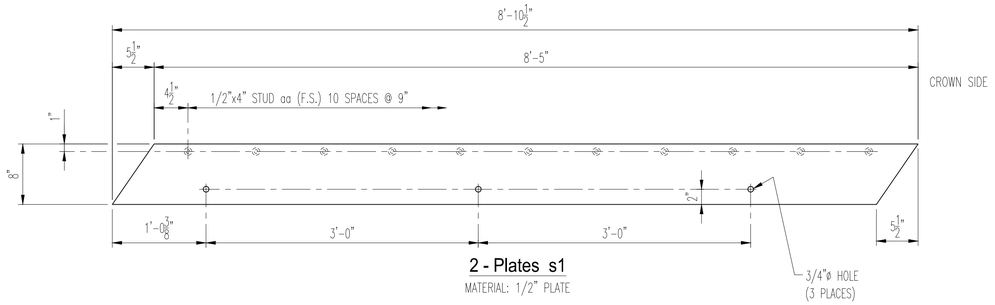
2 - Stop Bars r1

MATERIAL: 1/2" PLATE



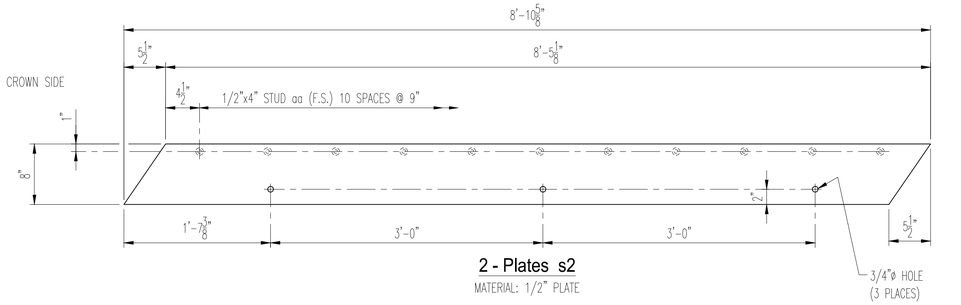
2 - Stop Bars r2

MATERIAL: 1/2" PLATE



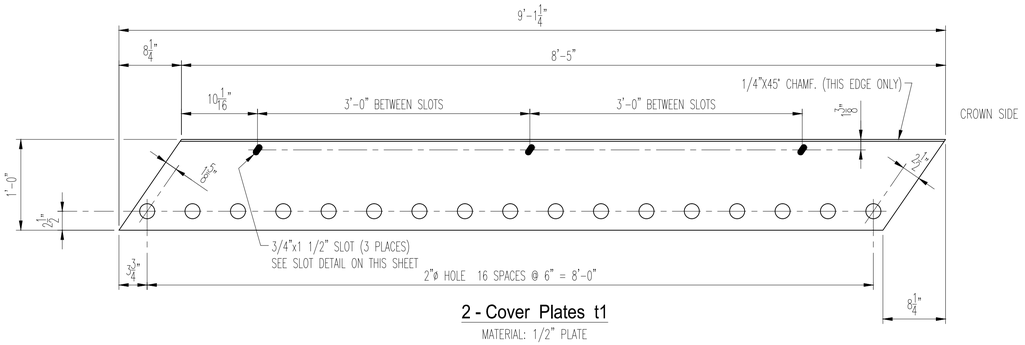
2 - Plates s1

MATERIAL: 1/2" PLATE



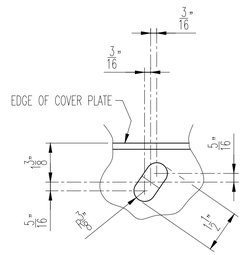
2 - Plates s2

MATERIAL: 1/2" PLATE

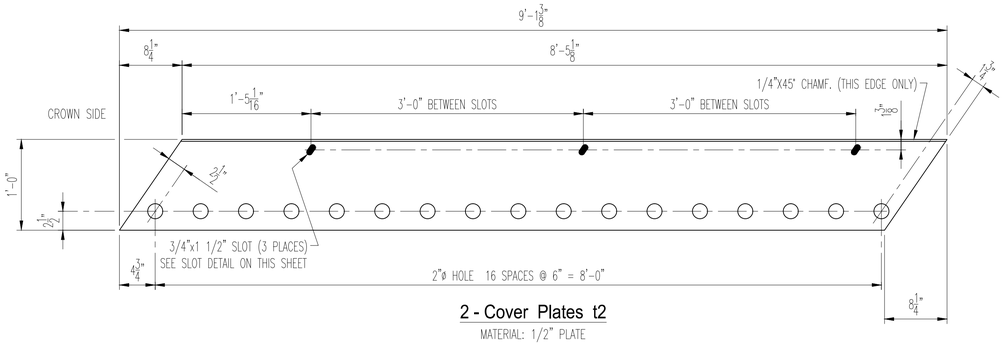


2 - Cover Plates t1

MATERIAL: 1/2" PLATE

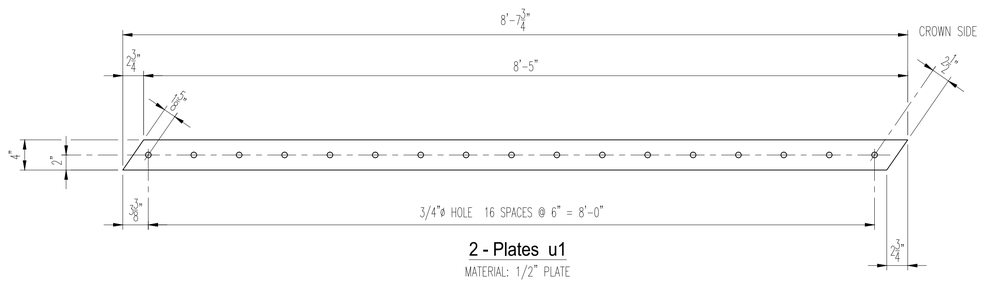


TYPICAL SLOT LAYOUT



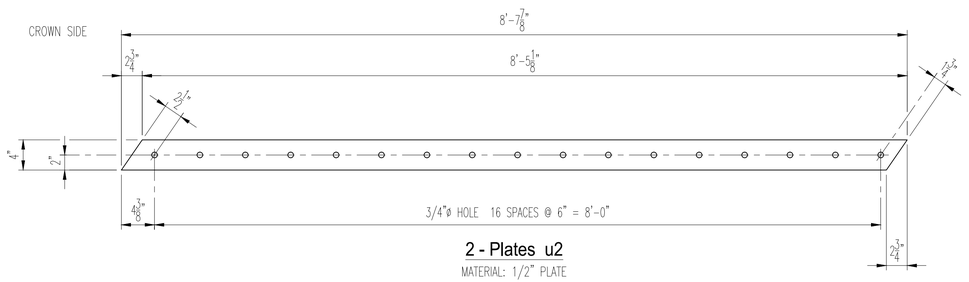
2 - Cover Plates t2

MATERIAL: 1/2" PLATE



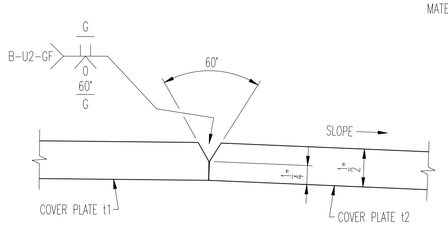
2 - Plates u1

MATERIAL: 1/2" PLATE



2 - Plates u2

MATERIAL: 1/2" PLATE



SPLICE WELD DETAIL AT CROWN

WELD AT COVER PLATES t1 & t2 IS SHOWN

THE WELD SHOWN IS TYPICAL AT r1 & r2 STOP BARS, PLATES s1 & s1 AND u1 & u2

NOTES:

SEE SHEETS 2 & 3 FOR THE LOCATIONS OF THESE PARTS

AISC CERTIFIED FABRICATOR

BRIDGE - INTERMEDIATE (MAJOR)
FRACTURE CRITICAL ENDORSEMENT
SOPHISTICATED PAINT ENDORSEMENT

REV. No.	REVISION
SHOP INSPECTED BY:	

APPROVAL

KOKOSING CONSTRUCTION

- ☑ NO EXCEPTIONS TAKEN
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BY mwf DATE 9/28/2020

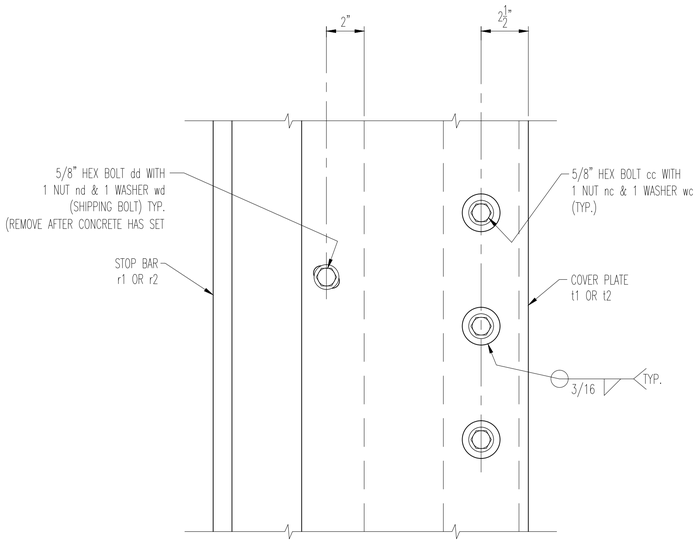
Ohio Structures Inc.
4030 Boardman Canfield Road, Ste. 200 D
Canfield, Ohio 44406
(330) 533-0084 Fax: (330) 533-0191

OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE: CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

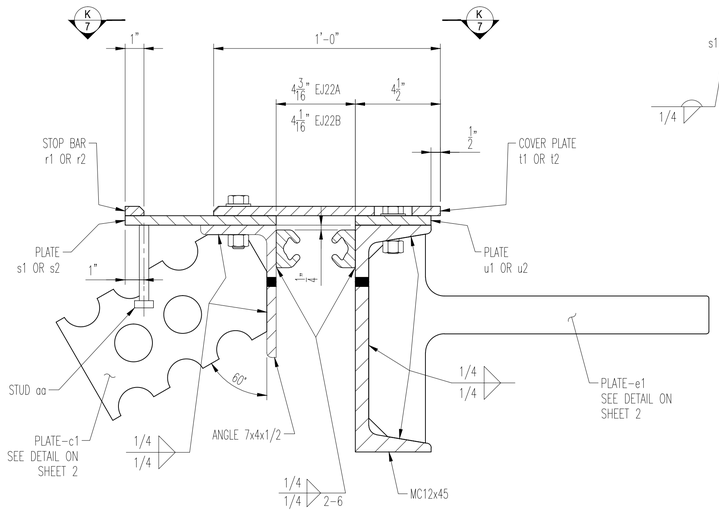
SCALE: N.T.S.	Kokosing Construction	DRAWN: JDC
DATE: 08/20		CHECK: MI

PLATE DETAILS

REF NO.: 17 (BU25)			ITEM NO.: 516
ODOT PROJ. NO.: 173000		CUYAHOGA COUNTY	DWG. NO.: D5
OSI PROJ. NO.: 19-22	PID NO.: 96833	SFN: TBD	6 OF 7

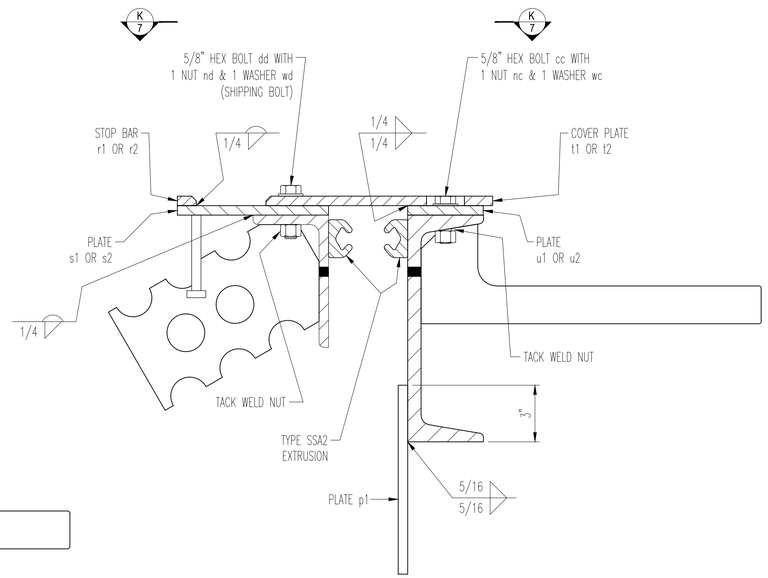


SECTION K7



SECTION C ℄ 2 & 3

SEE SECTION D/2 & 3 FOR ADDITIONAL DETAILS



SECTION D ℄ 2 & 3

SEE SECTION C/2 & 3 FOR ADDITIONAL DETAILS

GENERAL NOTES:

* ALL MATERIAL SHALL BE ASTM A709 GR50/36.
* MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH ODOT-CMS-2016.
* WELDING SHALL BE IN ACCORDANCE WITH AWS/AASHTO D1.5-15 AND ODOT 1011.
* ALL MATERIAL TO BE METALIZED IN CONFORMANCE WITH O.D.O.T. STANDARD DRAWING EXJ-4-87 DATED 7/19/02.
* ALL INFORMATION & DIMENSIONS ARE TO BE APPROVED BY THE CONTRACTOR PRIOR TO COMMENCING FABRICATION.

ODOT PROJECT : 173000	PID NO.: 96833	OSI PROJECT NO.: 19-22	REF NO.: 17

EXPANSION JOINTS EJ22A & EJ22B

MATERIALS ONLY:

LINE	PO#	QTY	MARK	SECTION	LENGTH (FEET)	LENGTH (INCHES)	STL SPEC	PC WT (IN LBS)	NET WT (IN LBS)	HEAT #	REMARK
1		1	a1	ANGLE 7x4x1/2	8	8 3/4	A709-50	156.25	156.25		
2		1	a2	ANGLE 7x4x1/2	8	8 13/16	A709-50	156.35	156.35		
3		1	a3	ANGLE 7x4x1/2	8	8 13/16	A709-50	156.35	156.35		
4		1	a4	ANGLE 7x4x1/2	8	8 7/8	A709-50	156.44	156.44		
5		1	b1	MC12x45.0	9	7 3/4	A709-50	434.06	434.06		
6		1	b2	MC12x45.0	9	8 1/4	A709-50	435.94	435.94		
7		1	b3	MC12x45.0	9	7 3/4	A709-50	434.06	434.06		
8		1	b4	MC12x45.0	9	8 3/8	A709-50	436.41	436.41		
9		6	n1	ANGLE 6x4x3/4	0	8	A709-50	15.73	94.40		
10		24	c1	PLATE 3/8 x 6	0	11	A709-36	4.92	118.08		
11		20	d1	PLATE 1/2 x 5 1/4	1	6	A709-36	6.36	127.20		
12		8	e1	PLATE 1/2 x 11 1/16	1	6	A709-36	8.69	69.52		
13		2	g1	PLATE 1/2 x 11	1	4 1/2	A709-36	24.53	49.06		
14		2	g2	PLATE 1/2 x 11	1	4 1/2	A709-36	24.53	49.06		
15		1	h1	PLATE 1/2 x 9 1/2	0	11	A709-36	13.62	13.62		
16		1	h2	PLATE 1/2 x 9 7/8	0	11	A709-36	13.90	13.90		
17		1	h3	PLATE 1/2 x 9 1/2	0	11	A709-36	13.52	13.52		
18		1	h4	PLATE 1/2 x 9 15/16	0	11	A709-36	13.98	13.98		
19		4	p1	PLATE 1/2 x 10	2	0	A709-50	34.03	136.12		
20		2	r1	PLATE 1/2 x 1	8	5 11/16	A709-36	14.32	28.64		BEVEL
21		2	r2	PLATE 1/2 x 1	8	5 13/16	A709-36	14.34	28.68		BEVEL
22		2	s1	PLATE 1/2 x 8	8	10 1/2	A709-36	114.58	229.16		
23		2	s2	PLATE 1/2 x 8	8	10 5/8	A709-36	114.72	229.44		
24		2	t1	PLATE 1/2 x 12	9	1 1/4	A709-36	171.87	343.74		BEVEL
25		2	t2	PLATE 1/2 x 12	9	1 3/8	A709-36	172.08	344.16		BEVEL
26		2	u1	PLATE 1/2 x 4	8	7 3/4	A709-36	57.29	114.58		
27		2	u2	PLATE 1/2 x 4	8	7 7/8	A709-36	57.36	114.72		
								SUB TOTAL	4,497.43		

HARDWARE ONLY:

LINE		QTY	MARK	DESCRIPTION	STL SPEC	WT PER (IN LBS)	NET WT (IN LBS)	HEAT #	REMARKS
28		96	aa	1/2"x4" STUD	A108	0.29	27.84		
29		12	bb	3/4x2-1/4 HEX HEAD BOLT	A325 Galv	0.42	5.04		@ n1 ANGLES
30		12	nb	3/4 HEAVY HEX NUT	A563 Galv	0.20	2.40		@ n1 ANGLES
31		12	wb	3/4 FLAT WASHER	F436 Galv	0.04	0.49		@ n1 ANGLES
32		68	cc	5/8x2 HEX HEAD BOLT	A307 Galv	0.26	17.41		@ COVER PLATES
33		68	nc	5/8 HEAVY HEX NUT	A563 Galv	0.12	8.16		@ COVER PLATES
34		68	wc	5/8 FLAT WASHER	F436 Galv	0.03	2.24		@ COVER PLATES
35		12	dd	5/8x2-1/4 HEX HEAD BOLT	A307	0.28	3.32		SHIPPING
36		12	nd	5/8 HEAVY HEX NUT	A307	0.12	1.44		SHIPPING
37		12	wd	5/8 FLAT WASHER	A307	0.03	0.40		SHIPPING
						SUB TOTAL	68.74		

MISC:

LINE		QTY	MARK	DESCRIPTION		WT PER (IN LBS)	NET WT (IN LBS)	HEAT #	REMARKS
38		3.25	---	SSA2 EXTRUSION x 23'-0"	A709-36	121.90	396.18		D.S. BROWN
39		* 2	---	A2R-400 STRIP SEAL x 19'-6"		0.00	0.00		D.S. BROWN
40		* 1	---	GALLON OF SEAL GLUE		0.00	0.00		D.S. BROWN
						SUB TOTAL	396.18		
				* INDICATES AN ITEM THAT WILL BE SHIPPED LOOSE		TOTAL WT	4,962.35		

AISC CERTIFIED FABRICATOR

BRIDGE - INTERMEDIATE (MAJOR)
FRACTURE CRITICAL ENDORSEMENT
SOPHISTICATED PAINT ENDORSEMENT

REV. No.	REVISION

SHOP INSPECTED BY:

APPROVAL

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BY rnwf DATE 9/28/2020

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Canfield, Ohio 44406
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OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE: CUY-E89ST-4015 (EAST 89TH STREET)
PEDESTRIAN BRIDGE OVER NORFOLK SOUTHERN & GCRTA

SCALE: N.T.S.	Kokosing Construction	DRAWN: JDC
DATE: 08/20		CHECK: MI

EXPANSION JOINT DETAILS & BILL OF MATERIAL

REF NO.: 17 (BU25)		ITEM NO.: 516
ODOT PROJ. NO.: 173000	CUYAHOGA COUNTY	DWG. NO.: D6
OSI PROJ. NO.: 19-22	PID NO.: 96833 SFN: TBD	7 OF 7

Submittal: 128

Revision:
Date Submitted: 4/13/2021
Response Due By:

kokosing
CONSTRUCTION COMPANY, INC.
886 McKinley Ave.
Columbus, OH 43222
Phone: (614) 228-1029
Fax: (614) 228-7065

Project: 16051 - ODOT 173000 CUY IR 490/SR010 (OC3)
Description: BU25 E 89th Bridge Fence Drawings

To: Mark Gabele, PE
Ohio Department of Transportation - District 12
Email: Mark.Gabele@dot.ohio.gov

From: Nicole DeVille
Kokosing Construction Company, Inc.
Email: nfd@kokosing.biz

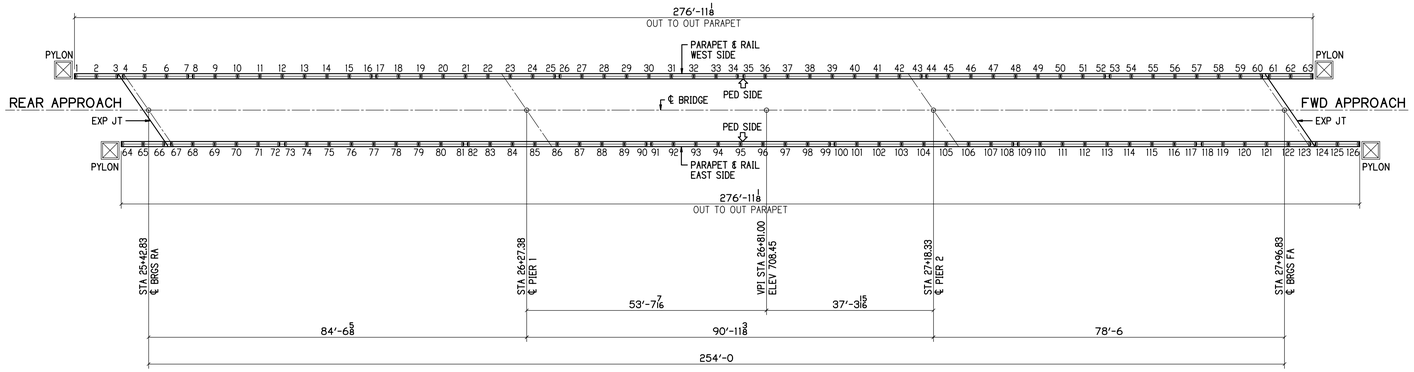
Submittal Type:	**Submitted For:**
☐ Engineered Drawings	☒ Approval
☒ Shop Drawings	☐ Record
☐ Working Drawings	☐ Other
☐ CPM Schedule	
☐ Material Certifications / Test Results	**Sent Via:**
☐ Reports	☒ Attached (Electronic)
☐ Product Data/Samples	☐ Attached (Hard Copy)
☐ Other:	

Submittal #	Copies	Spec #	Rev. #	Description	
128	1			128 – BU25 E 89th Bridge Fence Drawings	

Comments:

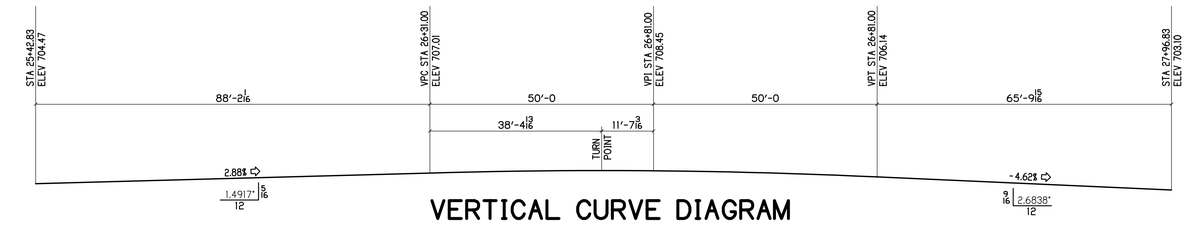
Nicole DeVille

Signed: _____

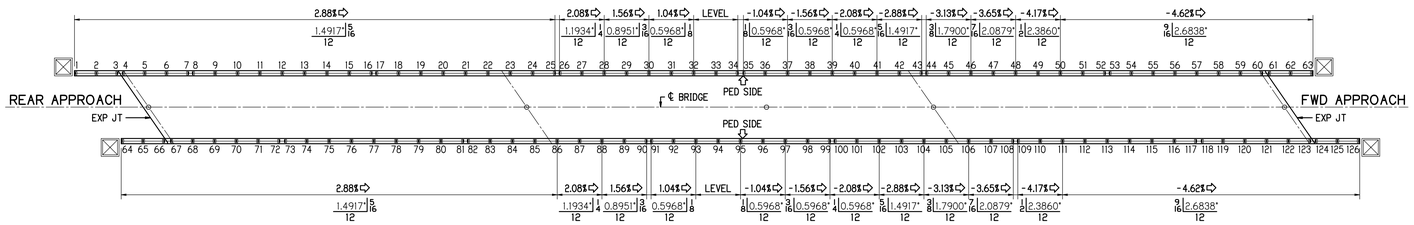


GENERAL PLAN

E 89TH STREET PEDESTRIAN BRIDGE
ALL DIMENSIONS ARE IN PLAN



VERTICAL CURVE DIAGRAM



RAIL SLOPE PLAN

APPROVAL SUBMIT FOR ANCHOR AND POST LOCATIONS ONLY 04-06-21

INDEX OF SHEETS

VERTICAL CURVE DATA

VPC STA 2631.0000 EL = 707.0100
VPI STA 2681.0000 EL = 708.4500
VPT STA 2731.0000 EL = 706.1400

LC = 100.0000
G1 = 2.8800%
G2 = -4.6200%
K = 13.3333
E = 0.9375
RC = 7.5000
TP = STA 2669.4000 EL = 707.5630

STATION INCREMENT = 10.0000
GRADE SHOWN FOR STA IS FROM PREVIOUS STA

STA 2631.0000 EL = 707.0100 VPC STA
STA 2641.0000 EL = 707.2605 GRD = 2.5050%
STA 2651.0000 EL = 707.4360 GRD = 1.7550%
STA 2661.0000 EL = 707.5365 GRD = 1.0050%
STA 2671.0000 EL = 707.5620 GRD = 0.2550%
STA 2681.0000 EL = 707.5125 GRD = -0.4950%
STA 2691.0000 EL = 707.3880 GRD = -1.2450%
STA 2701.0000 EL = 707.1885 GRD = -1.9950%
STA 2711.0000 EL = 706.9140 GRD = -2.7450%
STA 2721.0000 EL = 706.5645 GRD = -3.4950%
STA 2731.0000 EL = 706.1400 GRD = -4.2450% VPT STA

GENERAL NOTES

FINISH

THE FABRICATED RAILING AND HARDWARE (EXCEPT EMBED ANCHORS) SHALL BE GALVANIZED PER C&MS 711.02 EXCEPT THAT FABRICATED RAILING ELEMENTS SHALL NOT BE POST TREATED WITH WATER QUENCHING OR CHROMATE CONVERSION COATED.

ALL VENT HOLES REQUIRED FOR GALVANIZING SHALL BE AT THE DISCRETION OF THE FABRICATOR AND GALVANIZER.

THE PAINT SYSTEM SHALL BE PROVIDED UNDER A SEPARATE COVER. THE FINISH COAT SHALL MATCH FEDERAL COLOR STANDARD FS 595C-17038 BLACK.

WELDING

AWS - BRIDGE WELDING CODE D1.5 - LATEST EDITION

AWS - STRUCTURAL WELDING CODE D1.1 - LATEST EDITION

WELD PROCESS SHALL BE GMAW

RAILING NOTES

1. ALL POSTS SHALL BE FABRICATED AND SET PLUMB TO GRADE ALL RAIL PANELS SHALL FOLLOW THE GRADE.
2. ALL EMBEDDED ANCHORS SHALL BE INSTALLED WITH A TOLERANCE OF +/- 1/16".
3. ALL TEMPLATE PLATES FOR THE ANCHORS SHALL NOT BE SUPPLIED BY THIS FABRICATOR. THE CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL THE ANCHORS WITH THE PRECISION REQUIRED FOR POST INSTALLATION.
4. ALL PLASTIC BASE ℗ SHIMS AND CAULKING SHALL NOT BE SUPPLIED BY THIS FABRICATOR. THE CONTRACTOR OR INSTALLER SHALL BE REQUIRED TO SUPPLY AND INSTALL THESE REQUIREMENTS PER THE CONTRACT.

WIRE MESH NOTES

1. THE WELDED WIRE MESH SHALL BE 10.5 GA CORE WIRE, GALVANIZED AFTER WELDING.
2. THE WIRE MESH PATTERN SHALL BE 1x1 SET IN THE SQUARE POSITION AS PLUMB.
3. THE WIRE MESH PANELS SHALL BE FIELD INSTALLED USING CLAMP BARS.
4. THE CLAMP BARS SHALL BE SHOP DRILLED FOR FASTENER LOCATIONS.
5. FIELD INSTALLATION SHALL USE THE 1/4" SELF DRILL AND TAP SCREWS.
6. THE TEK SCREW HEADS SHALL BE FIELD PAINTED BLACK AFTER INSTALLATION.

MATERIAL NOTES

NO	MATERIAL	ASTM	GRADE	TYPE	NOTES
1	PLATES, ANGLES & BARS	A709	36/50		
2	HSS RAIL TUBES	A500	B		
3	WIRE MESH	A185-1064			

FASTENER NOTES

NO	MATERIAL	ASTM/ANSI	GRADE	TYPE	REMARKS
1	HIGH STRENGTH BOLTS	A325			GALV ASTM A153
2	HIGH STRENGTH NUTS	A563			GALV ASTM A153
3	HIGH STRENGTH WASHERS	F436			GALV ASTM A153
4	SS ALL THREAD ANCHOR RODS	A320	B8	304	MILL FINISH
5	SS HEX BOLTS	A194	B8	304	MILL FINISH
6	SS HEX NUTS	A194	B8	304	MILL FINISH
7	SS WASHERS	A194	B8	304	MILL FINISH

MATERIAL QUANTITY

DESCRIPTION	POSTS	CONTRACT LN/FT	ACTUAL LN/FT	REMARKS
BU-25 E 89TH STREET DECORATIVE FENCE	126	554'-0	557'-10 1/2	+3'-10 1/2

BU-25 EAST 89TH STREET

P.H. DREW INC.
2450 N. RACEWAY RD. - P.O. BOX 34295
INDIANAPOLIS, INDIANA 46234
PHONE : (317) 297-5152
FAX : (317) 297-5313

APPROVAL

CUY-IR490 / SR010-2.09 / 19.28
DECORATIVE FENCE
GENERAL PLANS & NOTES

REVISION

REV	DATE	DESCRIPTION	BY

APPROVAL RECORD

DATE	ISSUED	APP DATE	APPROVAL STATUS

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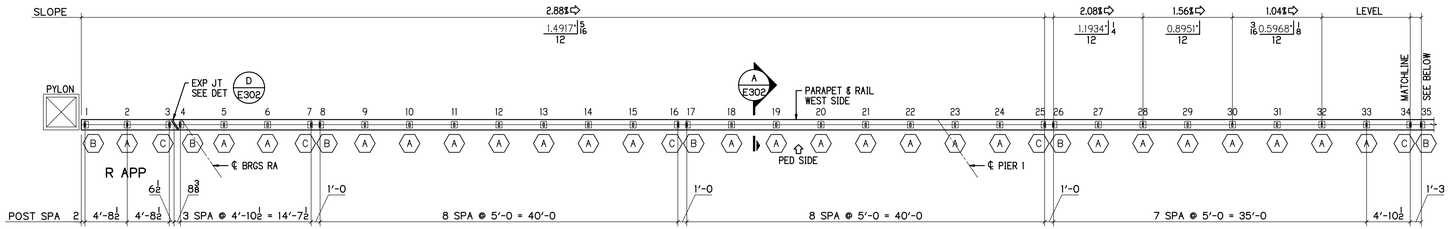
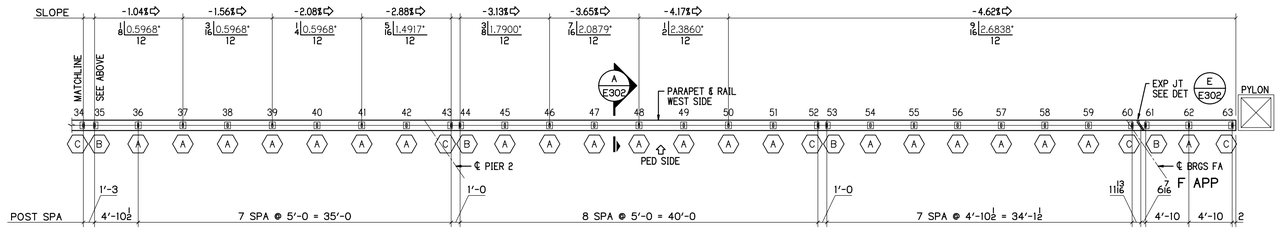
CONTRACT	PID 96833
SECTION	
STRUCTURE	
STATE JOB	
CUSTOMER	LAKE ERIE CONSTRUCTION COMPANY
CONTRACTOR	
ARCH/ENG	
REFERENCE	
ITEM	
FINISH	SEE NOTES-SHT E300

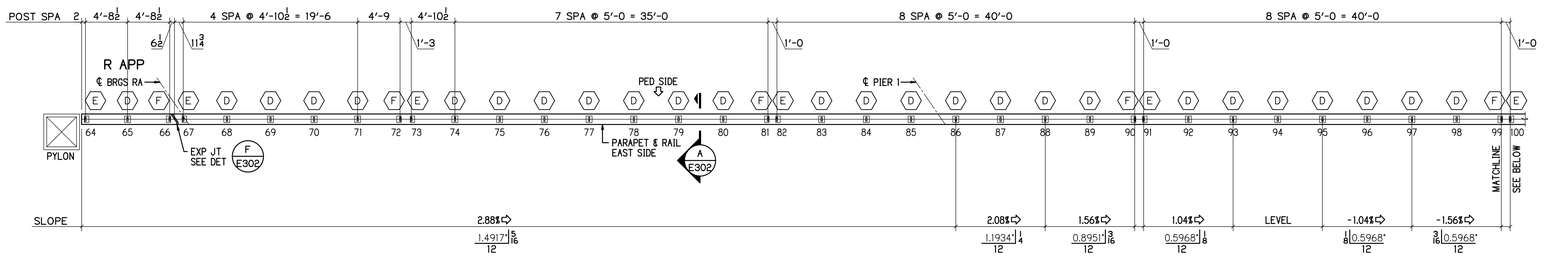
DRAWN BY	CHECKED BY	MRH NO	JOB MGR	DWG STATUS	JOB NO.	TOTAL SHEETS	SHEET
MRH 04-06-21		1914	JL	APPROVAL 04-06-21	19-1108		E300

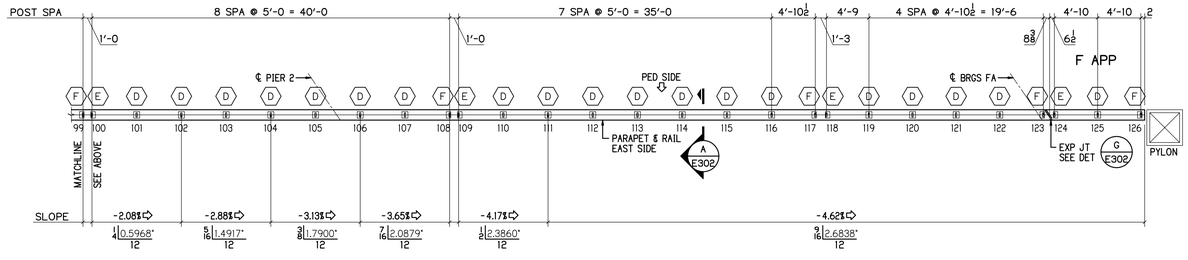




ANCHOR SETTING PLAN - WEST SIDE

ALL DIMENSIONS ARE IN PLAN





ANCHOR SETTING PLAN - EAST SIDE

ALL DIMENSIONS ARE IN PLAN

GRADE NOTE

DUE TO THE SLOPE ON THE NORTHERN PART OF THIS BRIDGE THE CONTRACTOR MAY INCREASE THE LENGTH BETWEEN POSTS TO ACCOMMODATE THE SLOPE. NO MORE THAN 1/16" INCREASE SHALL BE ALLOWED BETWEEN EACH POST.

BU-25 EAST 89TH STREET

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APPROVAL

CUY-IR490 / SR010-2.09 / 19.28

DECORATIVE FENCE

ANCHOR SETTING PLANS

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CONTRACTOR	
ARCH/ENG	
REFERENCE	
ITEM	
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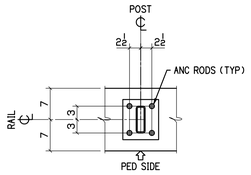
MRH 04-06-21		1914	JL	APPROVAL 04-06-21	19-1108		E301



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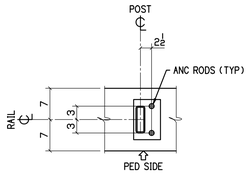

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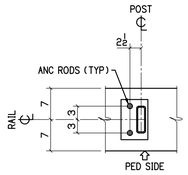

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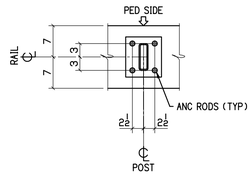

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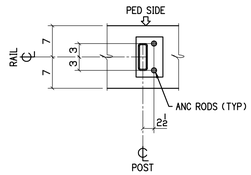

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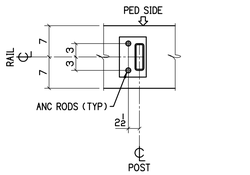

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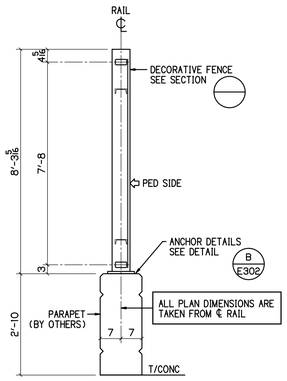
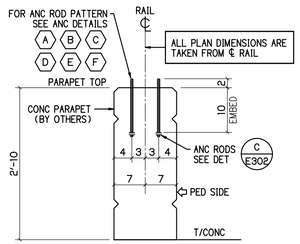


SECTION A E302
1/2" = 1'-0



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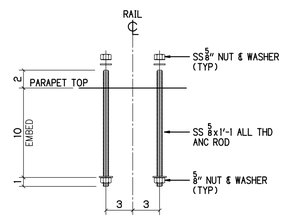

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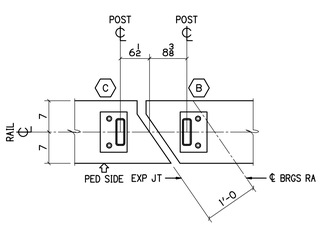
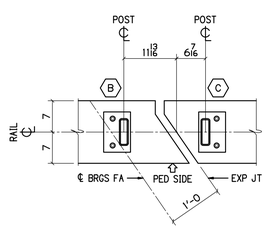
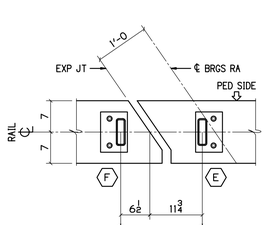


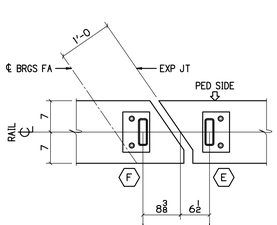
DETAIL D E302
3/4" = 1'-0



DETAIL E E302
3/4" = 1'-0



DETAIL F E302
3/4" = 1'-0



DETAIL G E302
3/4" = 1'-0

BU-25 EAST 89TH STREET

P.H. DREW INC.
2450 N. RACEWAY RD. - P.O. BOX 34295
INDIANAPOLIS, INDIANA 46234
PHONE : (317) 297-5152
FAX : (317) 297-5313

APPROVAL

CUY-IR490 / SR010-2.09 / 19.28

DECORATIVE FENCE

ANCHOR SETTING DETAILS

REVISION

REV	DATE	DESCRIPTION	BY

APPROVAL RECORD

DATE	ISSUED	APP DATE	APPROVAL STATUS

STATE	OHIO
COUNTY	CUYAHOGA (CITY OF CLEVELAND)
PROJECT	3000 (17)
CONTRACT	PID 96833
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STRUCTURE	
STATE JOB	
CUSTOMER	LAKE ERIE CONSTRUCTION COMPANY
CONTRACTOR	
ARCH/ENG	
REFERENCE	
ITEM	
FINISH	SEE NOTES - SHT E300

DRAWN BY	CHECKED BY	MRH NO	JOB MGR	DWG STATUS	JOB NO.	TOTAL SHEETS	SHEET
MRH 04-06-21		1914	JL	APPROVAL 04-06-21	19-1108		E302

Submittal: 132

Revision:
Date Submitted: 4/28/2021
Response Due By:

kokosing
CONSTRUCTION COMPANY, INC.
886 McKinley Ave.
Columbus, OH 43222
Phone: (614) 228-1029
Fax: (614) 228-7065

Project: 16051 - ODOT 173000 CUY IR 490/SR010 (OC3)
Description: BU25 - E 89th St Decorative Fence Shop Drawings

To: Mark Gabele, PE
Ohio Department of Transportation - District 12
Email: Mark.Gabele@dot.ohio.gov

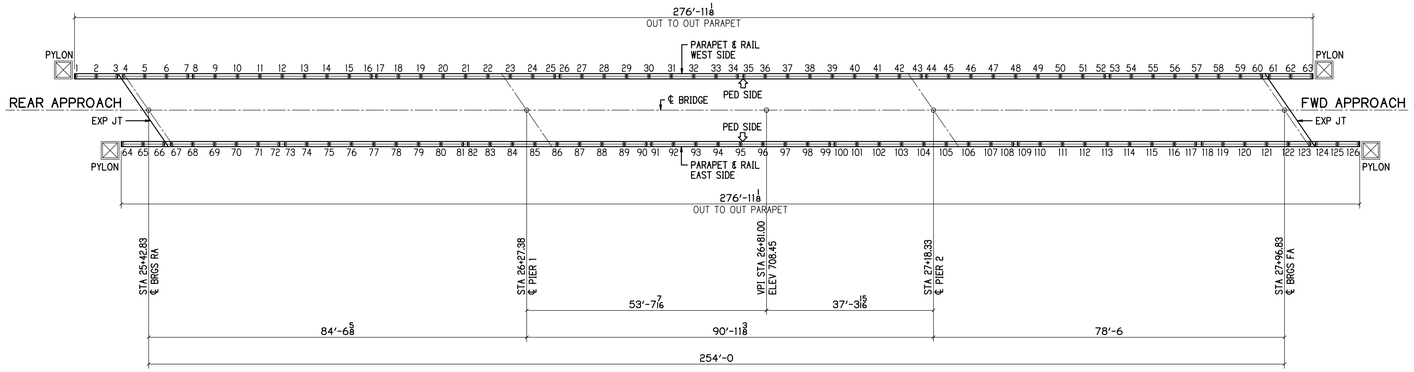
From: Nicole DeVille
Kokosing Construction Company, Inc.
Email: nfd@kokosing.biz

Submittal Type:	**Submitted For:**
☐ Engineered Drawings	☒ Approval
☒ Shop Drawings	☐ Record
☐ Working Drawings	☐ Other
☐ CPM Schedule	
☐ Material Certifications / Test Results	**Sent Via:**
☐ Reports	☒ Attached (Electronic)
☐ Product Data/Samples	☐ Attached (Hard Copy)
☐ Other:	

Submittal #	Copies	Spec #	Rev. #	Description	
132	1			132 – BU25 - E 89th St Decorative Fence Shop Drawings	

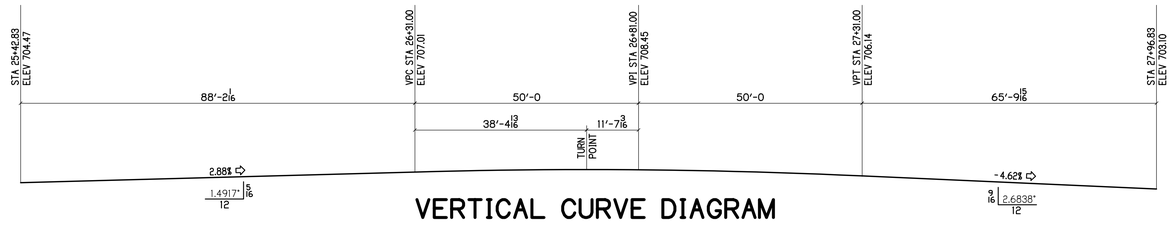
Comments:

Signed: Nicole DeVille

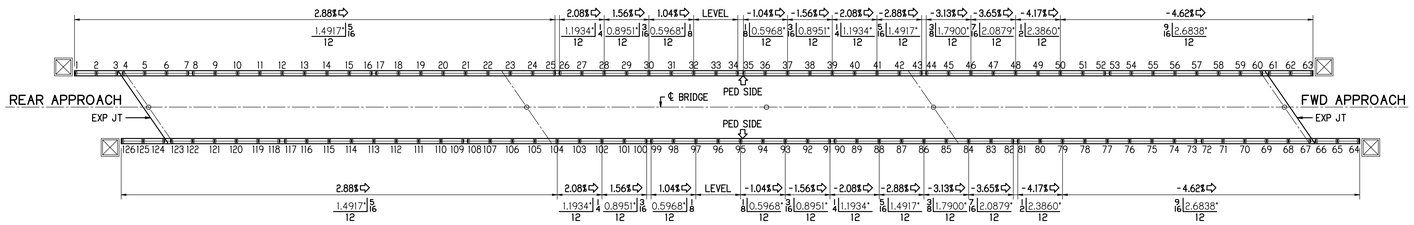


GENERAL PLAN

E 89TH STREET PEDESTRIAN BRIDGE
ALL DIMENSIONS ARE IN PLAN



VERTICAL CURVE DIAGRAM



RAIL SLOPE PLAN

INDEX OF SHEETS

VERTICAL CURVE DATA

VPC STA 2631.0000 EL = 707.0100
VPI STA 2681.0000 EL = 708.4500
VPT STA 2731.0000 EL = 706.1400

LC = 100.0000
G1 = 2.8800%
G2 = -4.6200%
K = 13.3333
E = 0.9375
RC = 7.5000
TP = STA 2669.4000 EL = 707.5630

STATION INCREMENT = 10.0000
GRADE SHOWN FOR STA IS FROM PREVIOUS STA

STA 2631.0000 EL = 707.0100 VPC STA
STA 2641.0000 EL = 707.2605 GRD = 2.5050%
STA 2651.0000 EL = 707.4360 GRD = 1.7550%
STA 2661.0000 EL = 707.5365 GRD = 1.0050%
STA 2671.0000 EL = 707.5620 GRD = 0.2550%
STA 2681.0000 EL = 707.5125 GRD = -0.4950%
STA 2691.0000 EL = 707.3880 GRD = -1.2450%
STA 2701.0000 EL = 707.1885 GRD = -1.9950%
STA 2711.0000 EL = 706.9140 GRD = -2.7450%
STA 2721.0000 EL = 706.5645 GRD = -3.4950%
STA 2731.0000 EL = 706.1400 GRD = -4.2450% VPT STA

GENERAL NOTES

FINISH

THE FABRICATED RAILING AND HARDWARE (EXCEPT EMBED ANCHORS) SHALL BE GALVANIZED PER C&MS 711.02 EXCEPT THAT FABRICATED RAILING ELEMENTS SHALL NOT BE POST TREATED WITH WATER QUENCHING OR CHROMATE CONVERSION COATED.

ALL VENT HOLES REQUIRED FOR GALVANIZING SHALL BE AT THE DISCRETION OF THE FABRICATOR AND GALVANIZER.

THE PAINT SYSTEM SHALL BE PROVIDED UNDER A SEPARATE COVER. THE FINISH COAT SHALL MATCH FEDERAL COLOR STANDARD FS 595C-17038 BLACK.

WELDING

AWS - BRIDGE WELDING CODE D1.5 - LATEST EDITION

AWS - STRUCTURAL WELDING CODE D1.1 - LATEST EDITION

WELD PROCESS SHALL BE GMAW

RAILING NOTES

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2. ALL EMBEDDED ANCHORS SHALL BE INSTALLED WITH A TOLERANCE OF +/- 1/16".
3. ALL TEMPLATE PLATES FOR THE ANCHORS SHALL NOT BE SUPPLIED BY THIS FABRICATOR. THE CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL THE ANCHORS WITH THE PRECISION REQUIRED FOR POST INSTALLATION.
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4. THE CLAMP BARS SHALL BE SHOP DRILLED FOR FASTENER LOCATIONS.
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MATERIAL NOTES

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MATERIAL QUANTITY

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BU-25 EAST 89TH STREET
FOR APPROVAL 04-26-21

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DECORATIVE FENCE

GENERAL PLANS & NOTES

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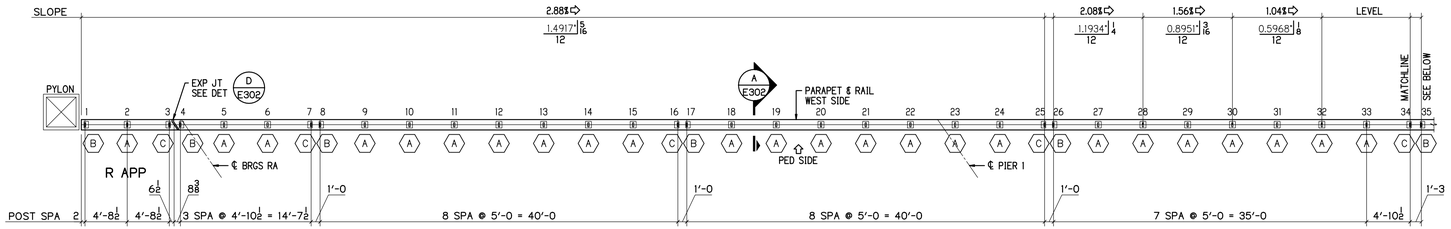
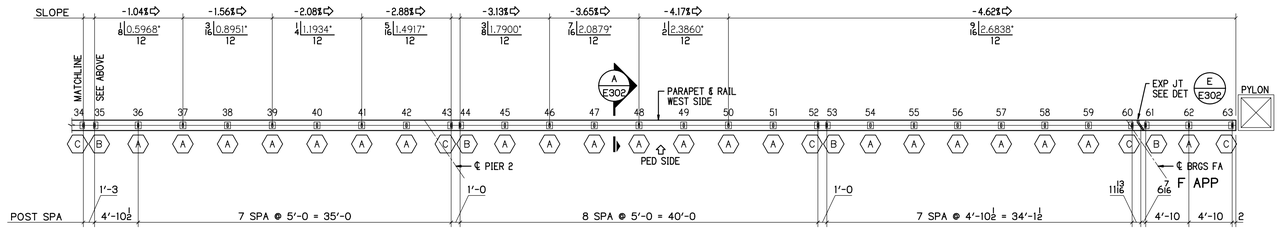
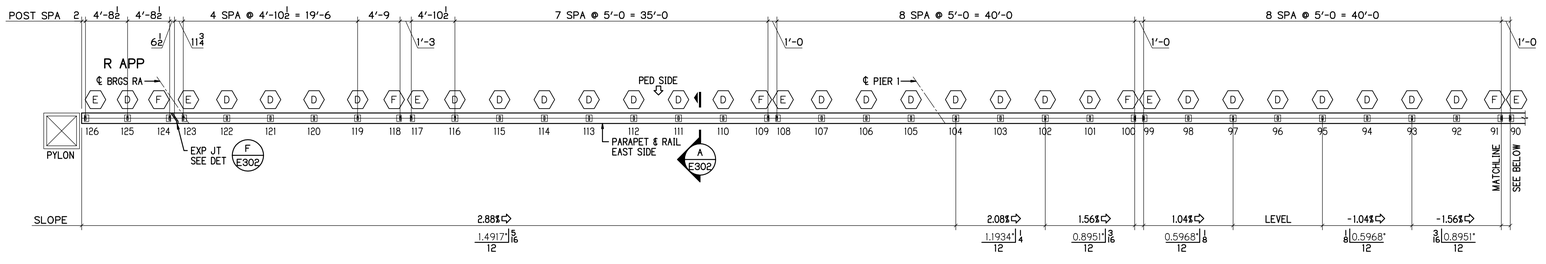
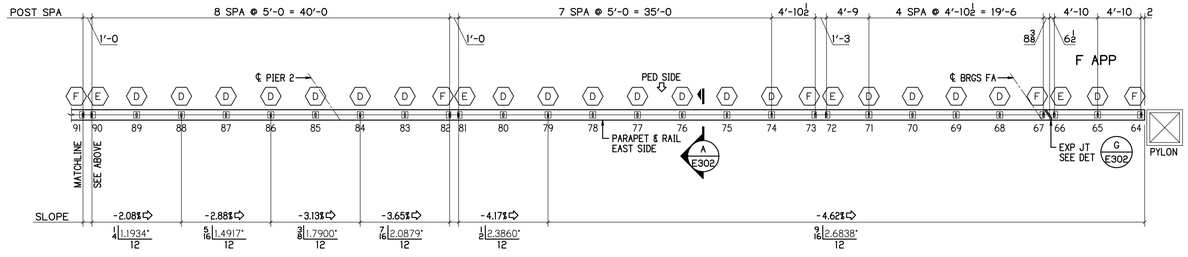




ANCHOR SETTING PLAN - WEST SIDE

ALL DIMENSIONS ARE IN PLAN





ANCHOR SETTING PLAN - EAST SIDE

ALL DIMENSIONS ARE IN PLAN

GRADE NOTE

DUE TO THE SLOPE ON THE NORTHERN PART OF THIS BRIDGE THE CONTRACTOR MAY INCREASE THE LENGTH BETWEEN POSTS TO ACCOMMODATE THE SLOPE. NO MORE THAN 1/16" INCREASE SHALL BE ALLOWED BETWEEN EACH POST.

DIMENSION NOTES

1. ALL DIMENSIONS SHOWN ARE TAKEN FROM THE CENTERLINE OF RAIL & PARAPET.
2. ALL DIMENSIONS SHOWN ARE IN PLAN ONLY.
3. SEE SHEET E302 FOR ANCHOR DETAILS.

LEGEND

(X) ANCHOR SETTING DETAIL

X POST NUMBER

BU-25 EAST 89TH STREET

FOR APPROVAL 04-26-21

P.H. DREW INC.
2450 N. RACEWAY RD. - P.O. BOX 34295
INDIANAPOLIS, INDIANA 46234
PHONE : (317) 297-5152
FAX : (317) 297-5313

APPROVAL

CUY-IR490 / SR010-2.09 / 19.28

DECORATIVE FENCE

ANCHOR SETTING PLANS

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ARCH/ENG	
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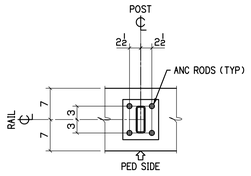
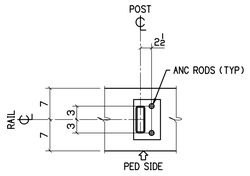


ANC DETAIL A



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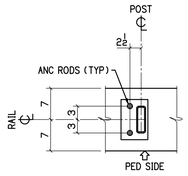
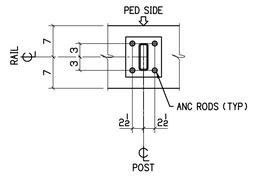
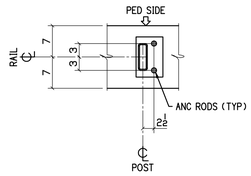


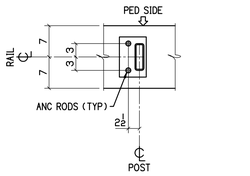
ANC DETAIL C



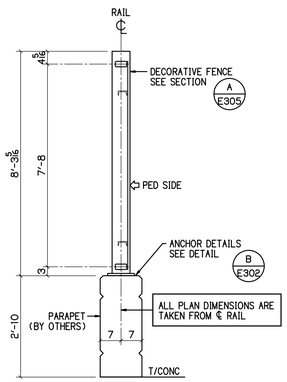
ANC DETAIL D



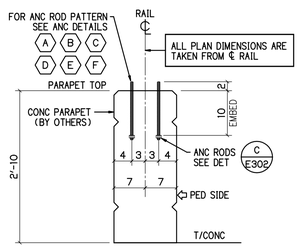
ANC DETAIL E



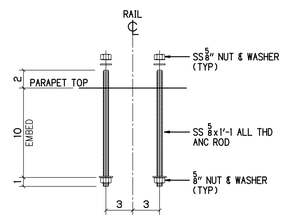
ANC DETAIL F



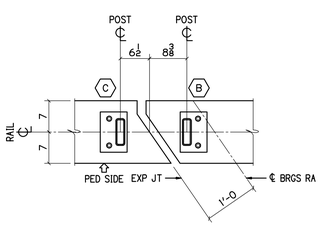
SECTION A E302
1/2" = 1'-0



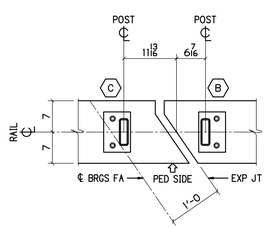
DETAIL B E302



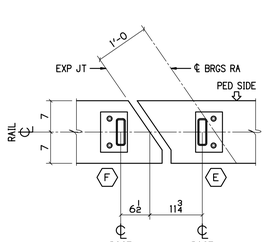
DETAIL C E302



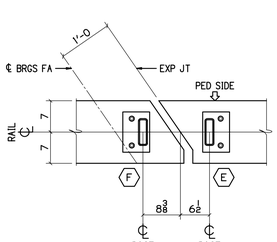
DETAIL D E302
3/4" = 1'-0



DETAIL E E302
3/4" = 1'-0



DETAIL F E302
3/4" = 1'-0



DETAIL G E302
3/4" = 1'-0

BU-25 EAST 89TH STREET

FOR APPROVAL 04-26-21

P.H. DREW INC.
2450 N. RACEWAY RD. - P.O. BOX 34295
INDIANAPOLIS, INDIANA 46234
PHONE : (317) 297-5152
FAX : (317) 297-5313

APPROVAL

CUY-IR490 / SR010-2.09 / 19.28

DECORATIVE FENCE

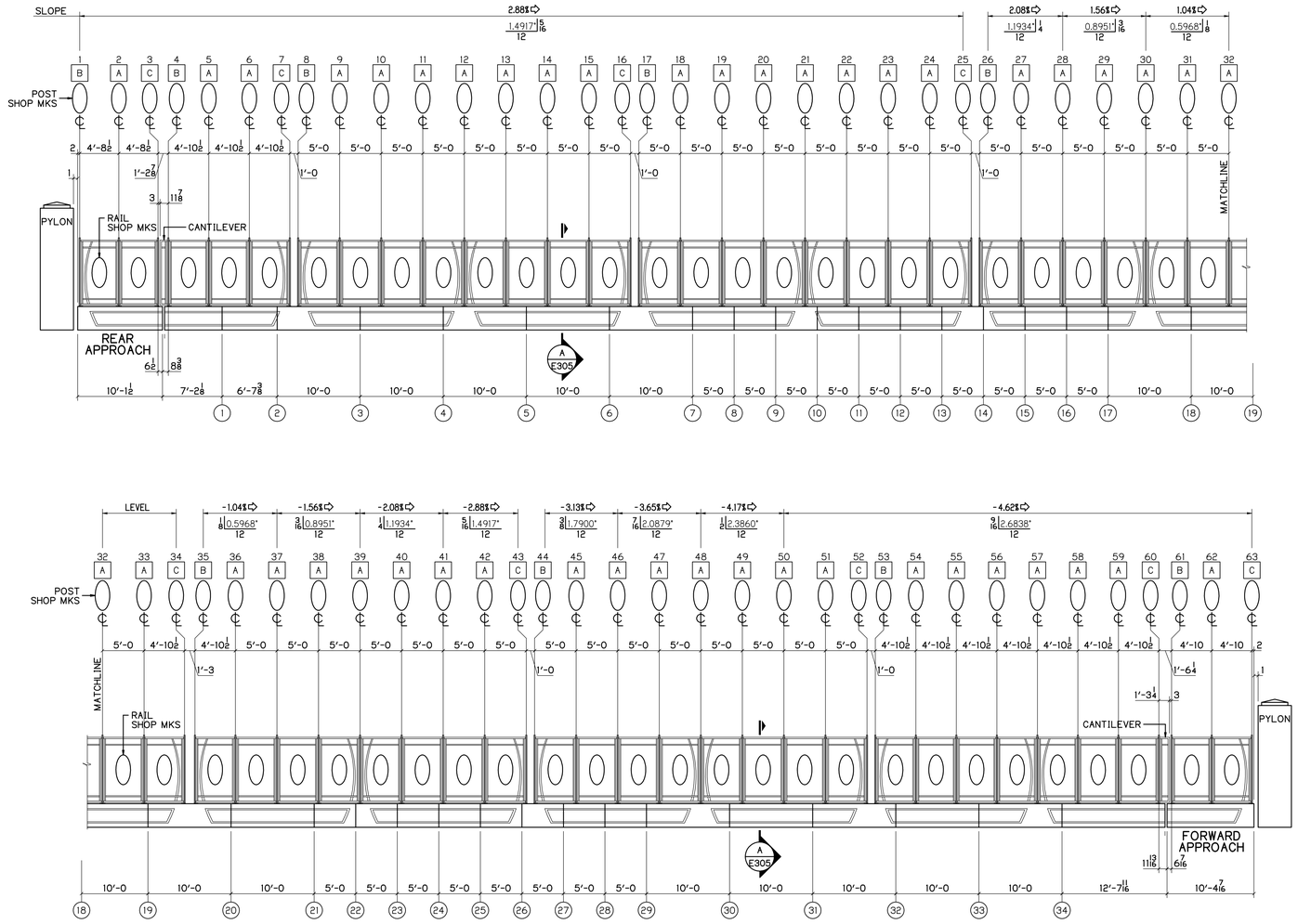
ANCHOR SETTING DETAILS

REVISION	REV	DATE	DESCRIPTION	BY

APPROVAL RECORD	DATE	ISSUED	APP DATE	APPROVAL STATUS
CONTRACTOR				
ARCH/ENG				
REFERENCE				
ITEM				

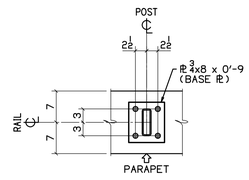
STATE	OHIO
COUNTY	CUYAHOGA (CITY OF CLEVELAND)
PROJECT	3000 (17)
CONTRACT	PID 96833
SECTION	
STRUCTURE	
STATE JOB	
CUSTOMER	LAKE ERIE CONSTRUCTION COMPANY
CONTRACTOR	
ARCH/ENG	
REFERENCE	
ITEM	
FINISH	SEE NOTES - SHT E300

DRAWN BY	CHECKED BY	MRH NO	JOB MGR	DWG STATUS	JOB NO.	TOTAL SHEETS	SHEET
MRH 04-06-21	SRF 04-20-21	1914	JL	APPROVAL 04-26-21	19-1108		E302

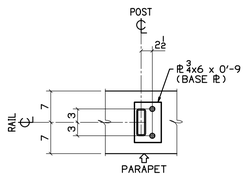


WEST PARAPET RAIL ELEVATION

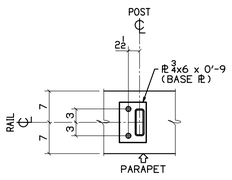
PEDESTRIAN SIDE SHOWN
NO WIRE ROPE



BASE PL DETAIL A



BASE PL DETAIL B



BASE PL DETAIL C

POST COUNT	
QUAN	MARK
X	X

RAIL COUNT	
QUAN	MARK
X	X

CLAMP BAR COUNT	
QUAN	MARK
X	X

WIRE MESH COUNT	
QUAN	MARK
X	X

RAILING NOTES

1. ALL POSTS SHALL BE SET PLUMB, RAILS SHALL FOLLOW GRADE.

WIRE MESH NOTES

1. SEE SHOP DRAWINGS FOR WIRE MESH & CLAMP BAR INSTALLATION.

DIMENSION NOTES

1. ALL DIMENSIONS SHOWN ARE TAKEN FROM THE CENTERLINE OF RAIL.
2. ALL DIMENSIONS SHOWN ARE IN PLAN ONLY.
3. SEE SHEET E302 FOR ANCHOR DETAILS.

LEGEND

- [X] BASE PL DETAIL
- (X) CONTR OR EXP JOINT NUMBER
- X POST NUMBER

BU-25 EAST 89TH STREET
FOR APPROVAL 04-26-21

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APPROVAL

CUY-IR490 / SR010-2.09 / 19.28

DECORATIVE FENCE

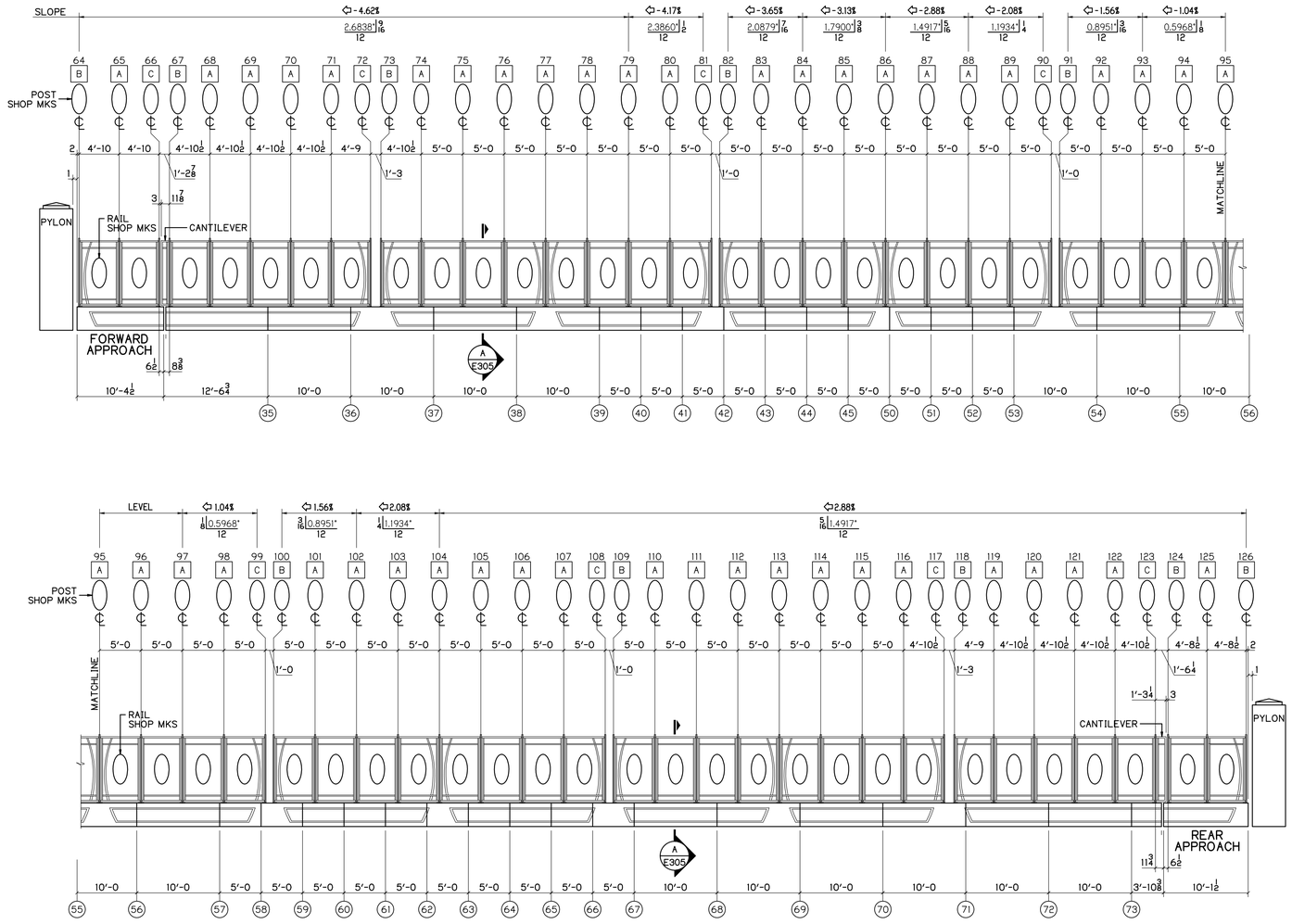
WEST PARAPET RAIL ELEVATION

REVISION	REV	DATE	DESCRIPTION	BY

APPROVAL RECORD	DATE	ISSUED	APP DATE	APPROVAL STATUS

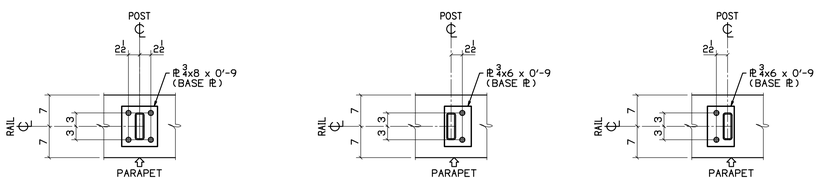
STATE	OHIO
COUNTY	CUYAHOGA (CITY OF CLEVELAND)
PROJECT	3000 (17)
CONTRACT	PID 96833
SECTION	
STRUCTURE	
STATE JOB	
CUSTOMER	LAKE ERIE CONSTRUCTION COMPANY
CONTRACTOR	
ARCH/ENG	
REFERENCE	
ITEM	
FINISH	SEE NOTES - SHT E300

DRAWN BY	CHECKED BY	MRH NO	JOB MGR	DWG STATUS	JOB NO.	TOTAL SHEETS	SHEET
MRH 04-26-21		1914	JL	APPROVAL 04-26-21	19-1108		E303



EAST PARAPET RAIL ELEVATION

PEDESTRIAN SIDE SHOWN
NO WIRE ROPE



BASE PL DETAIL A

BASE PL DETAIL B

BASE PL DETAIL C

POST COUNT	
QUAN	MARK
X	X

RAIL COUNT	
QUAN	MARK
X	X

CLAMP BAR COUNT	
QUAN	MARK
X	X

WIRE MESH COUNT	
QUAN	MARK
X	X

RAILING NOTES

1. ALL POSTS SHALL BE SET PLUMB, RAILS SHALL FOLLOW GRADE.

WIRE MESH NOTES

1. SEE SHOP DRAWINGS FOR WIRE MESH & CLAMP BAR INSTALLATION.

DIMENSION NOTES

1. ALL DIMENSIONS SHOWN ARE TAKEN FROM THE CENTERLINE OF RAIL.
2. ALL DIMENSIONS SHOWN ARE IN PLAN ONLY.
3. SEE SHEET E302 FOR ANCHOR DETAILS.

LEGEND

[X] BASE PL DETAIL

(X) CONTR OR EXP JOINT NUMBER

X POST NUMBER

BU-25 EAST 89TH STREET
FOR APPROVAL 04-26-21

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APPROVAL

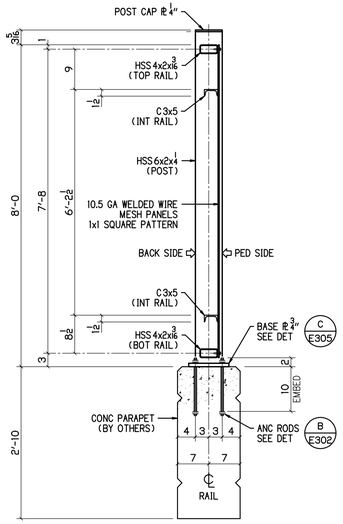
CUY-IR490 / SR010-2.09 / 19.28
DECORATIVE FENCE
EAST PARAPET RAIL ELEVATION

REVISION	REV	DATE	DESCRIPTION	BY

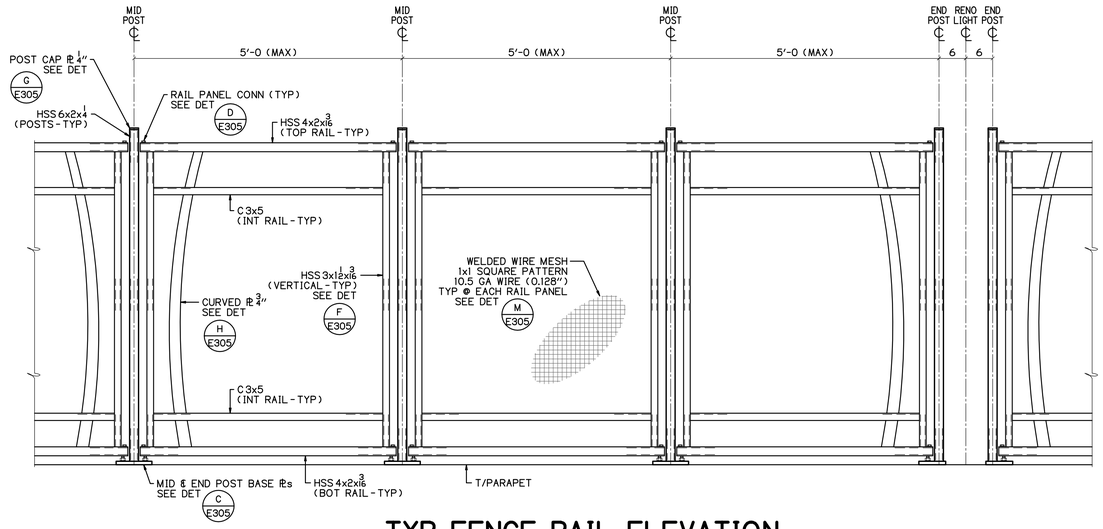
APPROVAL RECORD	DATE	ISSUED	APP DATE	APPROVAL STATUS

STATE	OHIO
COUNTY	CUYAHOGA (CITY OF CLEVELAND)
PROJECT	3000 (17)
CONTRACT	PID 96833
SECTION	
STRUCTURE	
STATE JOB	
CUSTOMER	LAKE ERIE CONSTRUCTION COMPANY
CONTRACTOR	
ARCH/ENG	
REFERENCE	
ITEM	
FINISH	SEE NOTES - SHT E300

DRAWN BY	CHECKED BY	MRH NO	JOB MGR	DWG STATUS	JOB NO.	TOTAL SHEETS	SHEET
MRH 04-26-21		1914	JL	APPROVAL 04-26-21	19-1108		E304

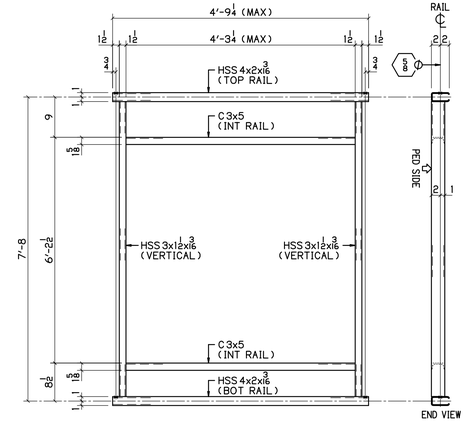


SECTION A E305
3/4" = 1'-0



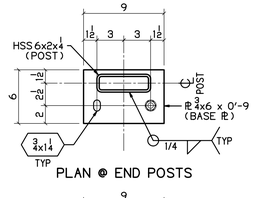
TYP FENCE RAIL ELEVATION

SCHEMATIC ONLY
WIRE MESH NOT SHOWN FOR CLARITY
PEDESTRIAN SIDE SHOWN

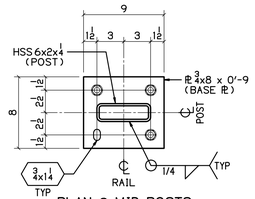


TYP FENCE RAIL DETAIL

LEVEL AND SLIGHT SLOPE
PEDESTRIAN SIDE SHOWN

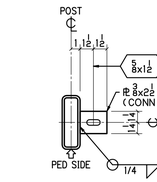


PLAN @ END POSTS

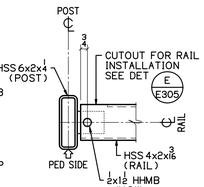


PLAN @ MID POSTS

DETAIL C E305
1 1/2" = 1'-0

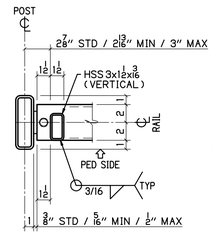


DET SHOWING CONN BAR



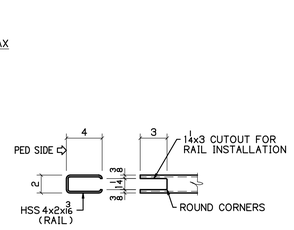
DET SHOWING RAIL CONN

DETAIL D E305
1 1/2" = 1'-0

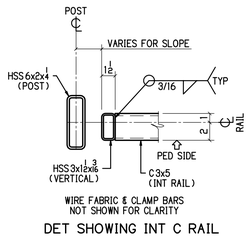


WIRE FABRIC & CLAMP BARS NOT SHOWN FOR CLARITY

DET SHOWING VERTICAL



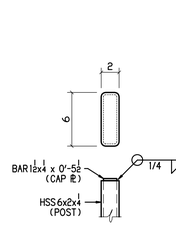
DETAIL E E305
1 1/2" = 1'-0



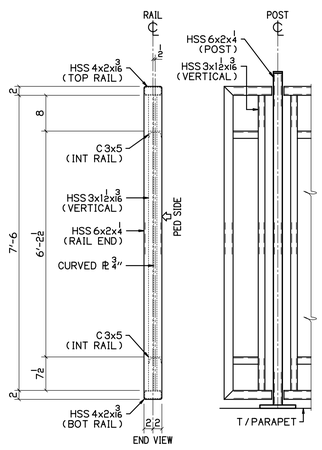
WIRE FABRIC & CLAMP BARS NOT SHOWN FOR CLARITY

DET SHOWING INT C RAIL

DETAIL F E305
1 1/2" = 1'-0

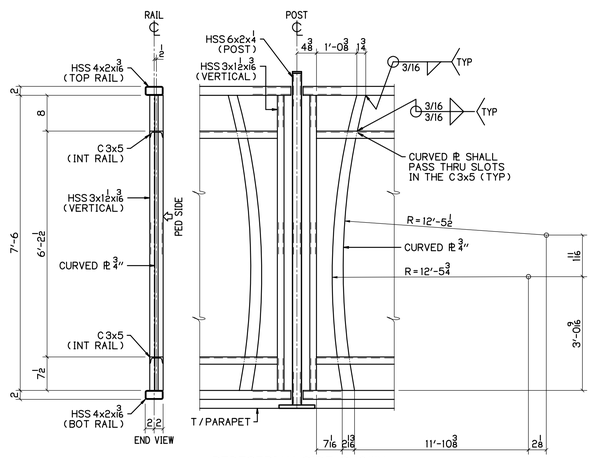


DETAIL G E305
1 1/2" = 1'-0



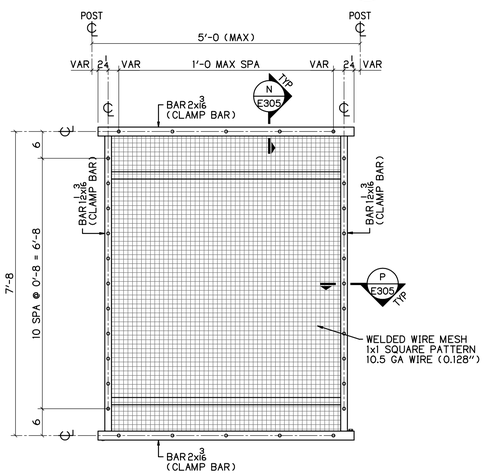
TYP RAIL CANTILEVER

PEDESTRIAN SIDE SHOWN
WIRE MESH
NOT SHOWN FOR CLARITY



PEDESTRIAN SIDE SHOWN
WIRE MESH
NOT SHOWN FOR CLARITY

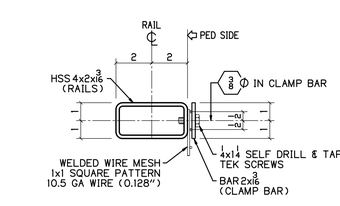
DETAIL H E305
3/4" = 1'-0



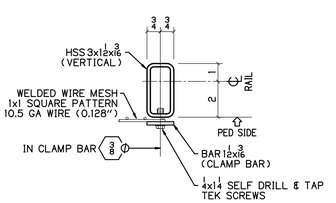
TYP WIRE MESH ELEVATION

PEDESTRIAN SIDE SHOWN
LEVEL SHOWN / SLOPED SIMILAR

DETAIL M E305
3/4" = 1'-0



SECTION N E305
3" = 1'-0



SECTION P E305
3" = 1'-0

BU-25 EAST 89TH STREET
FOR APPROVAL 04-26-21

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APPROVAL

CUY-IR490 / SR010-2.09 / 19.28

DECORATIVE FENCE

RAIL STANDARD DETAILS

REVISION	REV	DATE	DESCRIPTION	BY

APPROVAL RECORD	DATE	ISSUED	APP DATE	APPROVAL STATUS

STATE	OHIO
COUNTY	CUYAHOGA (CITY OF CLEVELAND)
PROJECT	3000 (17)
CONTRACT	PID 96833
SECTION	
STRUCTURE	
STATE JOB	
CUSTOMER	LAKE ERIE CONSTRUCTION COMPANY
CONTRACTOR	
ARCH/ENG	
REFERENCE	
ITEM	
FINISH	SEE NOTES - SHT E300

DRAWN BY	CHECKED BY	MRH NO	JOB MGR	DWG STATUS	JOB NO.	TOTAL SHEETS	SHEET
MRH 04-26-21		1914	JL	APPROVAL 04-26-21	19-1108		E305

ACCREDITED
Test Cert #3225.01

Nondestructive Examination Report Magnetic Particle

Client:	Kokosing Construction Company, Inc.	**Date:**	4/12/2022
Address:	6235 Westerville Road	**RNDT Job #:**	J22-1358
	Westerville, OH 43081	**Cust. P.O.#:**	
Location:	Cleveland, OH		
Spec. / Code:	ASTM E709-21		
Accept. Std.	No cracks located at arc strike locations		
NDE Procedure:	RNDT-MT-709D, Rev. 1		
Job Name:	Pedestrian Bridge - Woodland Ave		
Subcontract #:	16051-069	**ODOT Project #:**	173000
Type of Inspection:	Dry magnetic particle (MT) examination, in accordance with the above mentioned procedure, utilizing equipment, materials and values noted on page 2 of this report.		
Item Description:	Arc strike locations		
Areas Inspected:	Arc strike locations		

Examination Results

By use of a dry powder magnetic particle examination, fifty-six (56) arc strike areas were examined. The area of interest was all arc strike areas as directed by Kokosing Construction Company personnel. No cracks were noted at the time of inspection and the arc strike areas were found to be acceptable IAW the above noted acceptance criteria.

Technician:	George Scott Hollingsworth	**Level**	II	**Date:**	4/12/2022
Signature:					
Technique Sheet Attached:	Yes	**Additional Attachments:**		No	

All inspection results are valid only at the time of inspection.

228 Maple Avenue • Johnstown, PA 15901 • 814.535.5448 *phone*
814.535.5667 *fax* • 800.505.RNDT *toll free* • info@RNDT.net *email* • www.RNDT.net *web*

NDT Technique Record
Magnetic Particle

ACCREDITED
Test Cert #3225.01

Client:	Kokosing Construction Company, Inc.	**Date:**	4/12/2022
Address:	6235 Westerville Road	**RNDT Job #:**	J22-1358
	Westerville, OH 43081	**Cust. P.O.#:**	

Location:	Cleveland, OH
Spec. / Code:	ASTM E709-21
Accept. Std.:	No cracks located at arc strike locations
NDE Procedure:	RNDT-MT-709D, Rev. 1
Job Name:	Pedestrian Bridge - Woodland Ave
Subcontract #:	16051-069 **ODOT Project #:** 173000

WELDS		**OTHER TEST ITEMS**	
Weld Joint	N/A	**Type of Item**	HAZ
Weld Process	N/A	**Processing**	Unknown
Base Material	N/A	**Material**	Carbon Steel
Thickness	N/A	**Dimensions**	1" around arc strike
Weld Length / OD	N/A	**Additional Info.**	see below
Surface	N/A	**Surface Condition**	As processed

PRECLEAN:	**Method**	N/A	**Material**	N/A	**Batch No.**	N/A
EQUIPMENT:	**Make**	Parker Industries	**Model No.**	B300, SN 28599	**Cal. Due.**	9/22/2022
CURRENT:	**Amps**	Fixed AC				
CONTACTS:						
	Contact Material:	Carbon steel articulating legs			**Cable Size:**	N/A
	Prod / Leg Spacing:	4" to 6", pie gage used to verify			**Coil Turns:**	N/A
Lighting Equipment:		N/A			**Light Meter:**	N/A
PARTICLE TYPE:		Dry - Ancolor Red			**Lot Number:**	128259
Vehicle		Ambient Air				
Application:		Powder applicator, light dusting during application of current. Excess powder removed with puff bulb.				
METHOD:		Continuous				
DEMAG:	**Method**	N/A	**Residual Field After Demag:**		N/A	
POSTCLEAN:	**Method**	N/A	**Material**	N/A	**Batch No.**	N/A
OTHER INFORMATION:		Arc strike areas were power sanded/ground to repair arc strike and remove surface rust immediately prior to testing, the need to pre-clean was eliminated by this action.				

Technician:	George Scott Hollingsworth	**Level**	II	**Date:**	4/12/2022
Signature:					
Attachments:	No	**Pictures**	No		

All inspection results are valid only at the time of inspection.

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814.535.5667 *fax* • 800.505.RNDT *toll free* • info@RNDT.net *email* • www.RNDT.net *web*

RNDT inc. nondestructive testing & research

ACCREDITED
Test Cert #3225.01

TIME AND MATERIALS FORM

CLIENT: Kokosing Construction
DATE: 4/11/2022
LOCATION: Cleveland, OH
RNDT JOB NO: J22-1358
PO:
CONTACT: Scott Hartenstine
Project: Woodland Ave Pedestrian Bridge - Cleveland
Subcontract #: 16051-069
ODOT Project # 173000

NAME	SHIFT	HOURS ON SITE	TRAVEL TIME	TOTAL HOURS
George Scott Hollingsworth	1	5	7	12

VEHICLE ID NUMBER: Truck #95
MILES: 394 miles
ARRIVAL TIME: 9:00 AM
DEPARTURE TIME: 2:00 PM

JOB SCOPE: MT: (56) Arc strike locations

MATERIALS: (2) lb. ancolor red

COMMENTS:

The following signatures verify the above entries made, and work performed, are acceptable and accurate. It also verifies that a daily safety meeting was held prior to the start of work.

RNDT, Inc. Representative — *April 12, 2022* *Date*

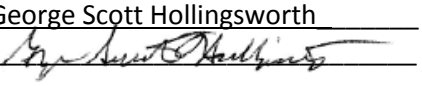
Client Representative — *April 12, 2022* *Date*

228 Maple Avenue • Johnstown, PA 15901 • 814.535.5448 *phone*
814.535.5667 *fax* • 800.505.RNDT *toll free* • info@RNDT.net *email* • www.RNDT.net *web*

Form: QC-141, Rev. 1

Job Safety Analysis

RNDT, Inc. Job Number: **J22-1358** **Date: 2022-04-12**	**Client:** **Kokosing Construction Company**	**Job Location (Including GPS Coordinate if required):** **Pedestrian Bridge** **9005 Woodland Avenue** **Cleveland, OH**

Performed Tasks: □ Radiographic Inspection ■ Magnetic Particle Inspection □ Penetrant Inspection □ Ultrasonic Inspection □ Visual Inspection □ Other _____	**Personnel Performing Tasks:** Name (Print): George Scott Hollingsworth Signature:  Name (Print):_____ Signature:_____ Name (Print):_____ Signature:_____

Required Personal Protective Equipment (PPE):

■ Safety Toe Shoes	□ Metatarsal Boots	□ Other _covid-19 mask_____
■ Safety Glasses	■ High Visibility Clothing	
□ Hearing Protection	■ Hard Hat	□ Other _survey meter_____
□ Leather Gloves	□ FR Clothing	
□ Metacarpal Gloves	□ Fall Protection	□ Other _dosimetry_____

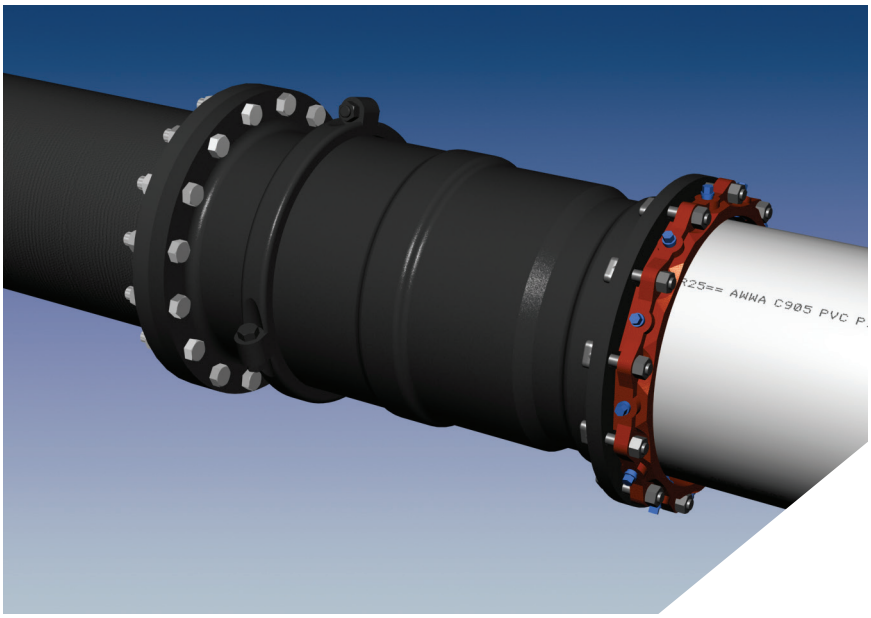
Sequence of Basic Job Steps	Potential Hazards	Preventive or Corrective Action
1) Unload and Setup	**1) Slip, Trip, Fall, Strain**	**1) Watch Footing and Path** **Proper Lift and Carry**
2) Perform Inspections	**2) electricity**	**2) inspect cords**
3) Breakdown and load up	**3) Same as #1**	**3) Same as #1**

Onsite Safety Meeting Topic

Watch your step

EX-TEND®

Expansion Joint for Water and Waste Water Pipelines



▲ *Series 216C0 EX-TEND, 16 inch combination mechanical joint by flanged expansion joint. (DIP by PVC)*
▼ *Series 216C0 EX-TEND, 16 inch combination mechanical joint by flanged expansion joint.*

Sample Specification

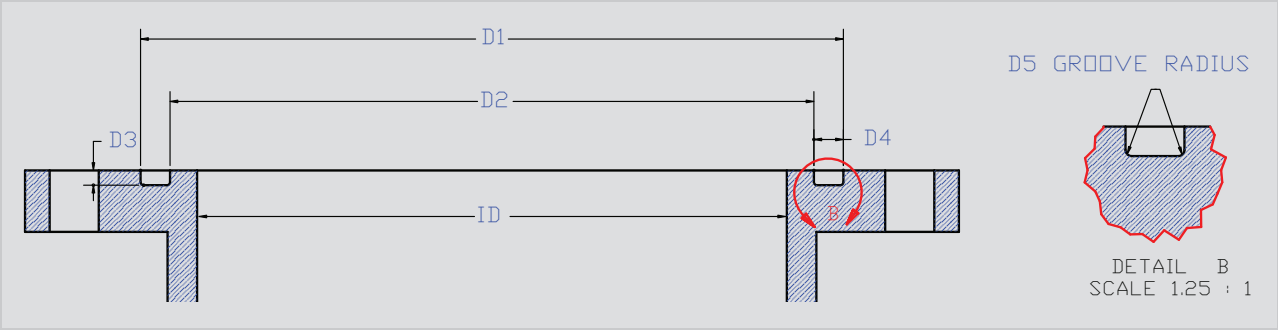
Expansion joints shall be installed in the locations indicated on the drawings and shall be manufactured of ductile iron conforming to the material properties of ANSI/AWWA C153/A21.53. All expansion joints shall be capable of expanding or contracting to the amounts shown on the drawings, or indicated in the specifications, but in no case shall there be less than 4" total axial movement. Separation beyond the maximum extension of the expansion joint shall be prevented without the use of external tie rods. Each expansion joint shall be pressure tested against its own restraint to a minimum of 350 psi (250 psi 24 inch and greater). MEGALUG joint restraint shall be provided with each mechanical joint connection. All internal surfaces (wetted parts) shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C213. Exterior surfaces shall be coated with a minimum of 6 mils of fusion bonded epoxy conforming to the applicable requirements of ANSI/AWWA C116/A21.16. Sealing gaskets shall be constructed of EPDM. The coating shall meet ANSI/NSF-61. All expansion joints shall be EX-TEND 200, as manufactured by EBAA Iron, Inc., or approved equal.

Features and Applications:

- Sizes 3 inch through 36 inch
- For Ductile Iron, Steel, PVC or HDPE pipe
- 3 inch through 20 inch rated at 350 PSI
  24 inch and greater rated at 250 PSI
- Constructed of ASTM A536 Ductile Iron
- No Periodic Maintenance is Required
- Each unit tested to rated working pressure prior to shipment
- Self restrained at full expansion without the use of external tie bars
- Due to the design of the seals, no periodic maintenance is required
- Seals conform to the applicable requirements of ANSI/AWWA C111/A21.11
- End connections:
  Flanged Joint; 3 inch through 36 inch
  Mechanical Joint; 3 inch through 24 inch
  Combination of the two Joints available
- Flange outlets conform to the dimensional requirements of ANSI/AWWA C110/A21.10 (class 150) with the addition of an O-ring gasket which is provided to ensure a watertight seal
- Mechanical Joint end connections conform to the dimensional requirements of either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53 depending on size
- All "wetted" parts are coated with a NSF61 approved fusion bonded epoxy
- Insertion of additional sleeves for increased expansion capacity can be done at the factory or in the field as the need occurs

For use on water or wastewater pipelines subject to hydrostatic pressure and tested in accordance with either AWWA C600, C605, or ASTM D2774.

FLEX-TEND, EX-TEND, AND FLEX-900 O-ring Groove



Size	D1	D2	D3	D4	D5	O-ring Diameter	O-ring Part Number
3	4.885	4.185	0.175	0.350	0.0625	0.25	983003
4	5.900	4.700	0.300	0.600	0.0625	0.5	983004
6	8.00	6.800	0.300	0.600	0.0625	0.5	983006
8	10.100	8.900	0.300	0.600	0.0625	0.5	983008
10	12.200	11.000	0.300	0.600	0.0625	0.5	983010
12	14.300	13.100	0.300	0.600	0.0625	0.5	983012
14	16.200	15.00	0.300	0.600	0.0625	0.5	983014
16	18.500	16.900	0.400	0.800	0.1250	0.625	983016
18	20.700	19.100	0.400	0.800	0.1250	0.625	983018
20	23.000	21.400	0.400	0.800	0.1250	0.625	983020
24	27.200	25.600	0.400	0.800	0.1250	0.625	983024
30	33.500	31.700	0.400	0.900	0.1250	0.75	983030
36	40.000	38.300	0.400	0.850	0.1250	0.75	983036
42	46.580	44.080	0.650	1.250	0.1250	N/A	983042
48	52.720	50.220	0.650	1.250	0.1250	1	983048

Determine your expansion requirements

Expansion Coefficient Table

Material	Coefficient inch/inch/degree F
Ductile Iron	0.0000062
PVC	0.000030
Cast Iron	0.0000058
Steel	0.0000065
HDPE	0.000080
Concrete	0.0000055

The Change in length (ΔL) due to thermal contraction/expansion is given by:

$$\Delta L = L\,(\Delta T)(C)$$

Where: L = length of pipe (inches)
ΔT = change in Temperature (degrees F)
C = coefficient of thermal expansion

Example:

1. Determine the Expansion Needed

   1000 Foot Bridge; 6 inch Ductile Iron Pipe; 120° F Total Temperature Change
   (1000)(12in/ft)(120° F)(0.0000062in/in/°F) = 8.93 in (Nearly 9 inches)

2. Select Proper Unit

   Referring to the chart on the opposite page, we will require a Series 206M2 EX-TEND because of the ability to accommodate the nine inches of expansion needed, with it's 12 inches of maximum expansion.

3. Determine the installation preset

   Factory preset for the EX-TEND is at 50% Contraction 50% Expansion setting, but the preset can be changed in the field to accommodate the present installation Temperature .

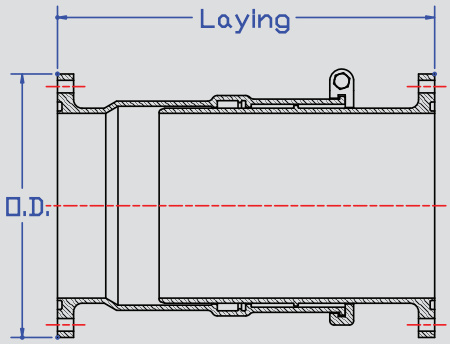
When working with continuous pipelines (i.e. fused HDPE, fused PVC, welded steel,...) be sure to consider the Poisson effect when determining expansion/contraction requirements.

Series 200 EX-TEND® Submittal Reference Drawing

EBAA IRON

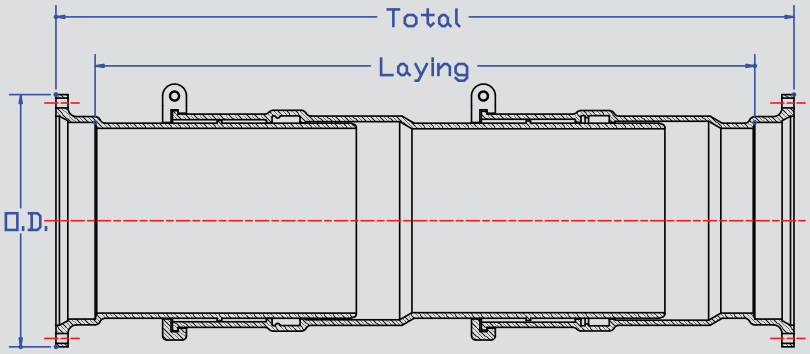
MADE IN USA

FLANGE BY FLANGE



STANDARD UNIT

MECHANICAL JOINT BY MECHANICAL JOINT



UNIT WITH ONE ADDITIONAL SLEEVE

		Flange by Flange				Mechanical Joint by Mechanical Joint				
Nominal Pipe Size	Expansion (Linear)	Series Number	Maximum O.D.	Laying*	Weight (Approx lbs.)	Series Number	Maximum O.D.	Laying*	Total*	Weight (Approx)
	4	203F0	‡	‡	‡	203M0	‡	‡	‡	‡
3	8	203F1	‡	‡	‡	203M1	‡	‡	‡	‡
	12	203F2	‡	‡	‡	203M2	‡	‡	‡	‡
	4	204F0	11.0	18.2	69	204M0	11.0	15.6	20.6	74
4	8	204F1	11.0	33.5	113	204M1	11.0	30.9	35.9	118
	12	204F2	11.0	48.8	157	204M2	11.0	46.2	51.2	162
	4	206F0	12.4	19.5	95	206M0	12.4	15.4	20.4	96
6	8	206F1	12.4	33.8	160	206M1	12.4	29.7	34.7	161
	12	206F2	12.4	48.1	225	206M2	12.4	44.0	49.0	226
	4	208F0	14.8	20.7	143	208M0	14.8	16.4	21.4	139
8	8	208F1	14.8	37.8	235	208M1	14.8	33.5	38.5	231
	12	208F2	14.8	54.9	327	208M2	14.8	50.6	55.6	323
	4	210F0	17.0	21.0	196	210M0	17.0	18.8	23.8	192
10	8	210F1	17.0	36.8	333	210M1	17.0	30.5	35.5	329
	12	210F2	17.0	52.6	470	210M2	17.0	44.5	49.5	466
	4	212F0	19.3	21.5	245	212M0	19.3	19.2	24.2	244
12	8	212F1	19.3	37.5	396	212M1	19.3	35.2	40.2	395
	12	212F2	19.3	53.5	547	212M2	19.3	51.2	56.2	546
	8	214F0	22.3	32.4	389	214M0	22.3	27.0	34.0	432
14	16	214F1	22.3	58.8	677	214M1	22.3	53.3	60.0	677
	24	214F2	22.3	85.3	922	214M2	22.3	79.6	87.0	921
	8	216F0	24.5	33.9	621	216M0	24.5	31.3	38.8	621
16	16	216F1	24.5	61.8	959	216M1	24.5	59.2	66.2	959
	24	216F2	24.5	89.7	1297	216M2	24.5	87.1	94.1	1297
	8	218F0	27.1	33.7	661	218M0	27.1	27.6	34.6	652
18	16	218F1	27.1	60.8	1041	218M1	27.1	54.7	61.7	1032
	24	218F2	27.1	87.9	1421	218M2	27.1	81.8	88.8	1412
	8	220F0	27.5	32.7	701	220M0	27.5	27.5	34.5	683
20	16	220F1	27.5	60.0	1123	220M1	27.5	54.8	61.8	1105
	24	220F2	27.5	87.3	1545	220M2	27.5	82.1	89.1	1527
	8	224F0	34.9	33.5	908	224M0	34.9	29.0	36.0	882
24	16	224F1	34.9	60.8	1610	224M1	34.9	56.3	63.3	1584
	24	224F2	34.9	88.1	2312	224M2	34.9	83.6	90.6	2286
	10	230F0	40.98	43.95	1433	~	~	~	~	~
30	20	230F1	40.98	78.79	2300	~	~	~	~	~
	30	230F2	40.98	113.63	3200	~	~	~	~	~
36	10	236F0	49.2	46.8	2347	~	~	~	~	~

NOTE: Dimensions are in inches ± 1% and are subject to change without notice. Contact EBAA for availability of sizes not shown or listed.

* Laying Lengths and Total Lengths reflect unit set at midpoint of expansion capacity.

‡ Contact EBAA for sizes not listed

Installation Instructions for EX-TEND® 200

1. Remove protective end covers.
2. Remove polyethylene sleeve and other material.
3. Check interior, remove dirt and foreign material from interior and end connections.
4. For buried applications install polyethylene sleeve per ANSI/AWWA C105/A21.5 recommendations.
5. Assembly of flange joint:
   a. Place flange o-ring in groove.
   b. Place EX-TEND flange against adjoining flange, install and hand tighten bolts.
   c. Tighten flange bolts.
6. Install mechanical joint EX-TEND end connections using the EBAA IRON MEGALUG® Joint Restraint suitable for adjacent pipe material.

   MEGALUG 1100 should be used on ductile iron pipe.

   MEGALUG 2000PV should be used on AWWA PVC pipe.

   Assembly instructions for each of these products are included with restraint device.
7. Assembly of restrained plain end:
   a. Lubricate and install EBAA-Seal® gasket provided over plain end per ANSI/AWWA C600.
   b. Insert plain end into adjacent mechanical joint bell.
   c. Install and hand tighten t-bolts.
   d. Tighten t-bolts per AWWA recommendations.
8. Remove shipping skid.
9. If coating was damaged by transport or installation, touch-up kits are available. Contact EBAA Iron to order the kits.

*

FM APPROVED

Important Notes

Due to hydrostatic forces that cause the EX-TEND 200 to expand, some applications may require blocking to isolate the areas of anticipated movement and to prevent this expansion from affecting adjacent piping.

In order for the EX-TEND 200 to protect pipeline connections, any load must be transferred to the unit by the restrained joints. Depending on the piping arrangement and the anticipated movement of the pipelines, adjacent piping must be restrained to adequately transfer the loads to the unit. Joint restraint is provided with each mechanical joint end connection.

The flanged outlets have dimensions according to ANSI/AWWA C110/A21.10 with each flange to ensure a proven water tight seal to a maximum of 350 PSI pressure.

Mechanical joint connections conform to the dimensional requirements of either ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 depending on the size.

When connecting a EX-TEND to HDPE pipe, a flanged end connection is required. This is to be joined to a fused flange adapter on the HDPE pipe. A filler flange between the two gaskets is necessary to assure proper seal contact.

EBAA IRON Sales, Inc.

P.O. Box 857, Eastland, TX 76448

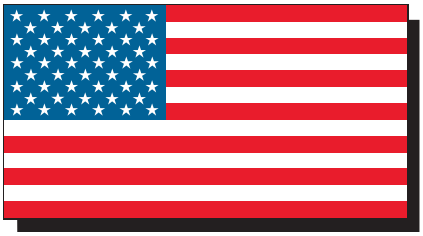
Tel: (254) 629-1731

Fax: (254) 629-8931

(800) 433-1716 within US and Canada

contact@ebaa.com

www.ebaa.com



Members of... AFS AMERICAN FOUNDRY SOCIETY

McWANE DUCTILE

IRON STRONG

TR FLEX

® RESTRAINED JOINT DUCTILE IRON PIPE AND FITTINGS

SIZES – 4" to 36"

McWANE DUCTILE | IRON STRONG

4" - 36" DUCTILE IRON TR FLEX® PIPE

MATERIAL	Ductile Iron per AWWA C150/ANSI A21.50, AWWA C151/ANSI A21.51, ASTM A536
PRESSURE	350 PSI Water Working Pressure 4" - 24" & 250PSI FOR 30 & 36"
TESTING	ANSI / AWWA C151 / ANSI 21.51 & UL - FM requirements
LAYING LENGTH	18 foot Nominal Length
CEMENT LINING	ANSI / AWWA C104 / ANSI 21.4
COATING	ANSI / AWWA C104 / ANSI 21.4
GASKETS	ANSI / AWWA C111/ ANSI A21.11
STANDARDS	AWWA C150/ANSI A21.50, AWWA C151/ANSI A21.51, AWWA C104 / ANSI 21.4, AWWA C111/ ANSI A21.11

4”-20”

24”-36”

❖ visit pe.mcwane.com for more information

❖ All Dimensions are in Inches

McWANE DUCTILE | IRON STRONG

DUCTILE IRON TR FLEX® Pulling Force at Equivalent Pressure for HDD Applications

Nominal Pipe Size	Pipe O.D. (in)	350 psi Equivalent Force	500 psi Equivalent Force	Recommended Maximum Pulling Force	Absolute Maximum Pulling Force
4	4.80	6,333	9,048	6,000	9,000
6	6.90	13,087	18,696	13,000	18,000
8	9.05	22,514	32,163	22,000	32,000
10	11.10	33,869	48,384	33,000	48,000
12	13.20	47,897	68,424	47,000	68,000
14	15.30	64,349	91,927	64,000	91,000
16	17.40	83,226	118,894	83,000	118,000
18	19.50	104,527	149,324	104,000	149,000
20	21.60	128,252	183,218	128,000	183,000
24	25.80	182,977	261,396	182,000	261,000
30	32.00	201,062	281,487	201,000	281,000
36	38.30	288,023	403,232	288,000	403,000

Notes:

- 350 psi is the rated pressure of the joint.
- 500 psi equivalent is the absolute maximum pulling force that should be used.
- 30" and 36" Equivalent Forces are 250 psi equivalent

Actual Laying Length

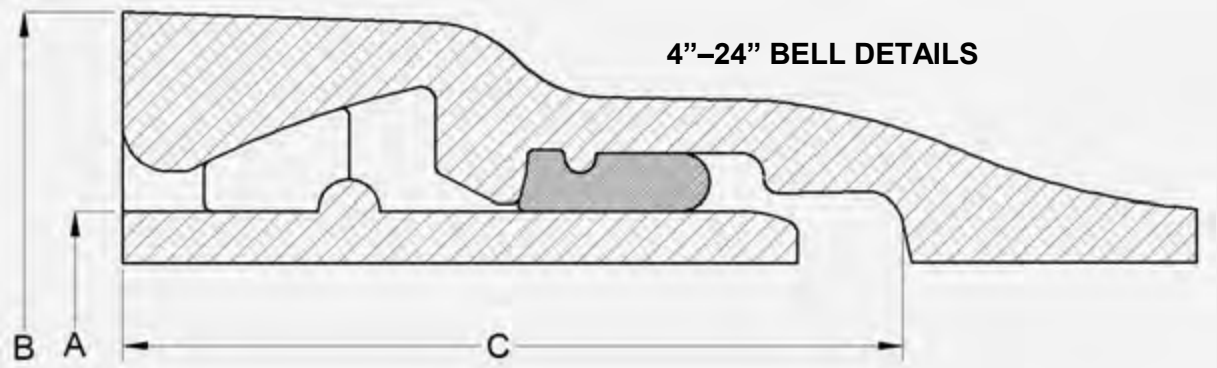
Nominal Size	Feet	Inch
4	18	1
6	18	1
8	18	1
10	17	11
12	17	11
14	17	10
16	17	10
18	17	10
20	17	9
24	17	9
30	17	9
36	17	7

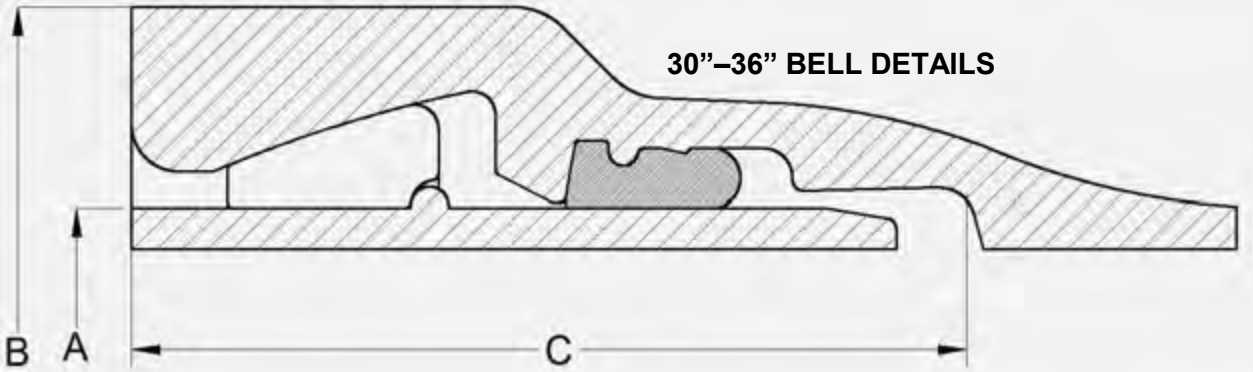
❖ visit pe.mcwane.com for more information

❖ All Dimensions are in Inches

McWANE DUCTILE | IRON STRONG

DUCTILE IRON TR FLEX® PIPE 4" - 36" Bell Details





Pipe Size In.	*Pressure Rating psi	A In.	B In.	C In.	# of D.I Locking Segments	# of Rubber Segments Retainers	Max Deflection Degrees	Pullout
4	350	4.80	7.25	4.84	2	1	5	0.03
6	350	6.90	9.52	5.27	2	1	5	0.04
8	350	9.05	11.93	5.82	2	1	5	0.04
10	350	11.10	14.37	6.03	2	1	5	0.05
12	350	13.20	16.68	6.30	4	2	5	0.06
14	350	15.30	19.16	7.75	4	2	3-1/4	0.05
16	350	17.40	21.46	7.95	4	2	3-1/4	0.05
18	350	19.50	23.76	8.19	4	2	3	0.05
20	350	21.60	26.04	8.40	4	2	2-1/2	0.05
24	350	25.80	30.61	8.86	8	4	2-1/4	0.05
30	250	32.00	36.88	10.28	8	4	1-3/4	0.05
36	250	38.30	43.85	10.87	8	4	1-1/2	0.05

*The TR FLEX® Restrained Joint has a working pressure rating equivalent to the working pressure rating of the parent pipe with a maximum working pressure rating of 350 psi for 4 in. through 24 in. and 250 psi for 30 in. through 36 in.
NOTE: These deflections are based on joints with nominal dimensions.

❖ visit pe.mcwane.com for more information

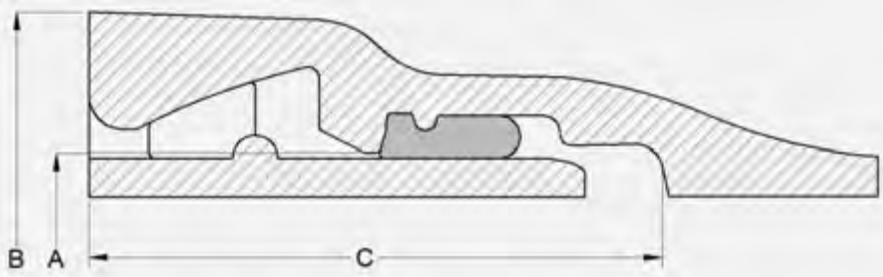
❖ All Dimensions are in Inches

McWANE DUCTILE | IRON STRONG

DUCTILE IRON TR FLEX® FITTINGS

MATERIAL	Ductile Iron Grade 70-50-05 in accordance with AWWA C153 / ANSI A21.53
PRESSURE	350 PSI Water Working Pressure for 4" - 24" & 250PSI for 30 & 36"
TESTING	AWWA C153 / ANSI A21.53 & UL - FM requirements
LAYING LENGTH	AWWA C153 / ANSI A21.53
CEMENT LINING	AWWA C104 / ANSI A21.4
COATING	AWWA C104 / ANSI A21.4
GASKETS	AWWA C111 / ANSI A21.11
STANDARDS	AWWA C153 / ANSI A21.53, AWWA C104 / ANSI A21.4, AWWA C111 / ANSI A21.11

BASIC SPECIFICATIONS



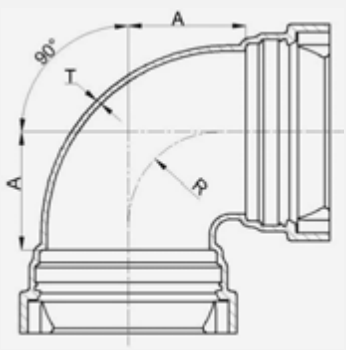
SIZE	A in	B in	C in
4	4.80	7.11	4.84
6	6.90	9.39	5.27
8	9.05	11.85	5.82
10	11.10	14.12	6.03
12	13.20	16.46	6.30
14	15.30	19.13	7.75
16	17.40	21.33	7.95
18	19.50	23.53	8.19
20	21.60	25.75	8.40
24	25.80	30.15	8.86
30	32.00	37.19	10.28
36	38.30	43.85	10.87

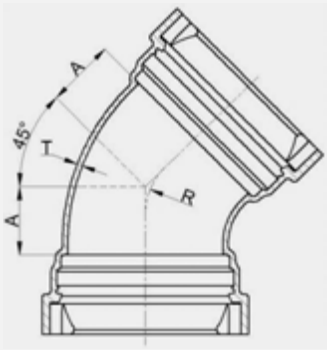
❖ visit pe.mcwane.com for more information

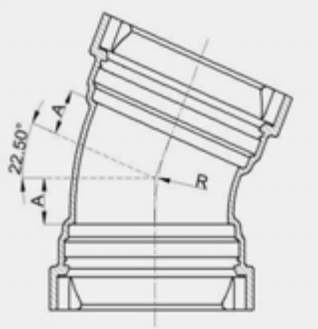
❖ All Dimensions are in Inches

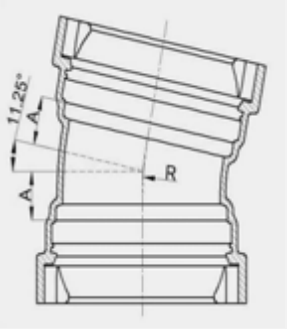
McWANE DUCTILE | IRON STRONG

TR FLEX® FITTING THICKNESS & DIMENSIONS BENDS









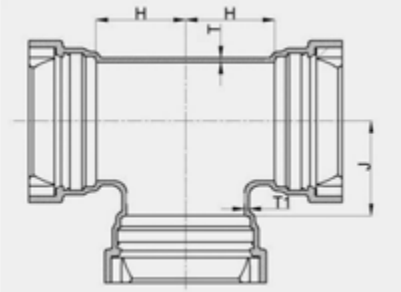
SIZE	90°			45°			22 1/2°			11 1/4°		
	A in	R in	T in	A in	R in	T in	A in	R in	T in	A in	R in	T in
4	4.00	3.34	0.34	2.00	3.24	0.34	1.50	4.23	0.34	1.25	6.01	0.34
6	5.00	4.31	0.36	3.00	5.57	0.36	2.00	6.57	0.36	1.50	8.19	0.36
8	6.50	5.60	0.38	3.50	6.28	0.38	2.50	8.04	0.38	1.75	8.62	0.38
10	7.50	6.68	0.40	4.50	8.89	0.40	3.00	10.97	0.40	2.00	12.00	0.40
12	9.00	7.76	0.42	5.50	11.00	0.42	3.50	13.50	0.42	2.25	14.50	0.42
14	11.50	10.00	0.47	5.00	8.50	0.47	3.75	12.00	0.47	2.50	11.00	0.47
16	12.50	11.00	0.50	5.50	9.50	0.50	3.75	11.50	0.50	2.50	10.00	0.50
18	14.00	12.50	0.54	6.00	10.50	0.54	4.50	14.50	0.54	3.00	14.00	0.54
20	15.00	13.50	0.57	7.00	13.00	0.57	4.50	14.00	0.57	3.00	13.00	0.57
24	16.75	15.00	0.61	7.50	14.00	0.61	4.50	14.00	0.61	3.00	13.50	0.61
30	21.50	19.00	0.66	10.50	20.50	0.66	6.75	24.00	0.66	4.75	29.00	0.66
36	24.50	22.00	0.74	11.50	22.50	0.74	7.75	28.00	0.74	5.00	30.00	0.74

❖ visit pe.mcwane.com for more information

❖ All Dimensions are in Inches

McWANE DUCTILE | IRON STRONG

TR FLEX® FITTING THICKNESS & DIMENSIONS TEES



SIZE		H in	J in	T in	T1 in
Run	Branch				
4	4	4.00	4.00	0.34	0.34
6	4	4.00	5.00	0.36	0.34
6	6	5.00	5.00	0.36	0.36
8	4	4.00	6.50	0.38	0.34
8	6	5.00	6.50	0.38	0.36
8	8	6.50	6.50	0.38	0.38
10	4	4.00	7.50	0.40	0.34
10	6	5.00	7.50	0.40	0.36
10	8	6.50	7.50	0.40	0.38
10	10	7.50	7.50	0.40	0.40
12	4	4.00	8.75	0.42	0.34
12	6	5.00	8.75	0.42	0.36
12	8	6.50	8.75	0.42	0.38
12	10	7.50	8.75	0.42	0.40
12	12	8.75	8.75	0.42	0.42
14	14	10.50	10.50	0.47	0.47
16	12	9.50	11.50	0.50	0.42
16	14	10.50	11.50	0.50	0.47
16	16	11.50	11.50	0.50	0.50
18	12	9.50	12.50	0.54	0.42
18	14	10.50	12.50	0.54	0.47
18	16	11.50	12.50	0.54	0.50
18	18	12.50	12.50	0.54	0.54
20	12	10.00	14.00	0.57	0.42
20	14	11.00	14.00	0.57	0.47
20	16	12.00	14.00	0.57	0.50
20	18	13.00	14.00	0.57	0.54
20	20	14.00	14.00	0.57	0.57

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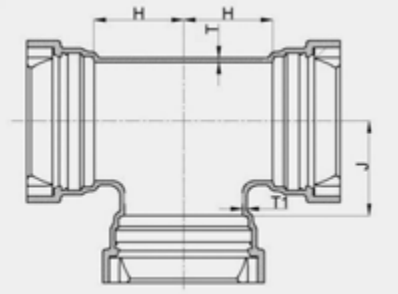
McWANE DUCTILE | IRON STRONG

TR FLEX® FITTING THICKNESS & DIMENSIONS TEES



SIZE		H in	J in	T in	T1 in
Run	Branch				
24	12	10.00	16.00	0.61	0.42
24	14	11.00	16.00	0.61	0.47
24	16	12.00	16.00	0.61	0.50
24	18	13.00	16.00	0.61	0.54
24	20	14.00	16.00	0.61	0.57
24	24	16.00	16.00	0.61	0.61
30	14	12.50	20.00	0.66	0.47
30	16	12.50	20.00	0.66	0.50
30	18	15.00	20.00	0.66	0.54
30	20	15.00	20.00	0.66	0.57
30	24	16.00	20.00	0.66	0.61
30	30	20.00	20.00	0.66	0.66
36	14	16.00	23.50	0.74	0.47
36	16	16.00	23.50	0.74	0.50
36	18	16.00	23.50	0.74	0.54
36	20	16.00	23.50	0.74	0.57
36	24	16.00	23.50	0.74	0.61
36	30	20.00	23.50	0.74	0.66
36	36	23.50	23.50	0.74	0.74

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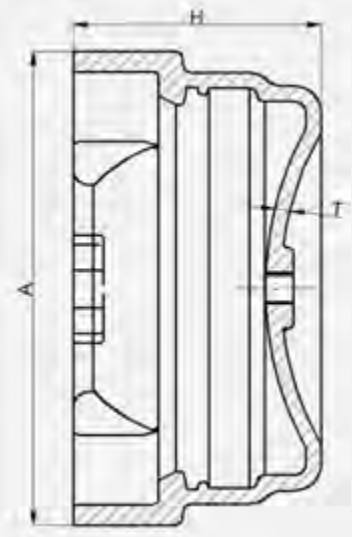
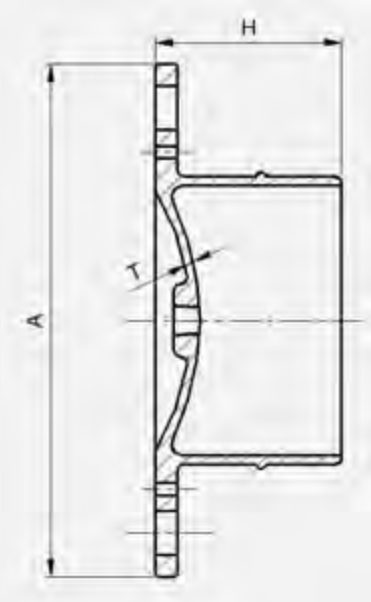
❖ All Dimensions are in Inches

McWANE DUCTILE | IRON STRONG

TR FLEX® FITTING THICKNESS & DIMENSIONS CAPS & PLUGS



SIZE	A in	T in	H in
4	7.11	0.34	5.18
6	9.39	0.36	5.63
8	11.85	0.38	6.20
10	14.12	0.40	6.43
12	16.46	0.42	6.72
14	19.13	0.47	8.22
16	21.33	0.50	8.45
18	23.53	0.54	8.73
20	25.75	0.57	8.97
24	30.15	0.61	9.47
30	37.19	0.66	10.94
36	43.85	0.74	11.61



SIZE	A in	T in	H in
4	12.00	0.34	6.50
6	14.50	0.36	7.00
8	17.00	0.38	7.50
10	20.00	0.80	8.00
12	23.50	0.80	11.00
14	21.75	0.47	10.25
16	24.00	0.50	10.25
18	26.25	0.54	10.50
20	28.50	0.57	10.75
24	32.50	0.61	11.25
30	40.25	0.66	13.50
36	46.50	0.74	14.25

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4"- 36" DUCTILE IRON TR FLEX® PIPE ASSEMBLY INSTRUCTIONS

TR Flex® pipes and fittings assembly instructions:

- When laying a pipe or fitting in a trench, orient the locking segment insertion bell slots so that:
  - The 2 slots on 4" - 20" pipe are at the horizontal or 3 and 9 o'clock positions
  - The 4 slots on 24" - 36" pipe are at the 2, 4, 8 and 10 o'clock positions or forming an 'X' when looking at the bell face

4"-20"

24"-36"

- Thoroughly clean the bell cavity area including the gasket seat and the locking segment groove to remove all dirt, debris and any foreign material(s) that could inhibit proper gasket sealing or locking segment placement. Ensure the gasket seat area is dry
- Insert a standard Tyton gasket in the bell socket, make sure the retainer bead on the heel of the gasket is fully inserted into the corresponding socket groove
- Apply a thin but continuous layer of lubricant on the installed gasket and the pipe spigot up to the weld bead
- Keeping the mating pipe aligned, insert the pipe spigot into the corresponding pipe bell and push home
- There are two locking segments for 4" - 10" joints, four locking segments for 12" - 20" joints and eight locking segments for 24" - 36" joints
- Insert the locking segments one at a time into the bell slots and rotate / slide each locking segment into the bell cavity. Red segments rotate to the right and black segments rotate to the left
- Insert the rubber retainer into the bell slot between two installed locking segments to retain the locking segments in their correct position
- Once all locking segments and rubber retainers are properly installed, pull back on the installed joint to fully extend the joint and set any desired deflection

❖ visit pe.mcwane.com for more information

* TR FLEX® is a registered trademark of U.S. Pipe